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Room Conditioner

SVC MANUAL(General)

MODEL : ASNW306DGM0
ASUW306DGM0
ASNW366DGM0
ASUW366DGM0

CAUTION

Before Servicing the unit, read the safety precautions in General SVC manual.
Only for authorized service personnel.

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1. General Information

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1. Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠WARNING	This symbol indicates the possibility of death or serious injury.
⚠CAUTION	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

	Be sure not to do.
	Be sure to follow the instruction.
	Dangerous Voltage

1.1 Cautions in Repair

⚠WARNING	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair.Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.	
Do not touch the discharging refrigerant gas during the repair work. The discharging refrigerant gas.The refrigerant gas can cause frostbite.	
Release the refrigerant gas completely at a well-ventilated place first. Otherwise, when the pipe is disconnected, refrigerant gas or refrigerating machine oil discharges and it Can cause injury.	
When the refrigerant gas leaks during work, execute ventilation. If the refrigerant gas touches to a fire, poisonous gas generates. A case of leakage of the refrigerant and the closed room full with gas is dangerous because a shortage of oxygen occurs. Be sure to execute ventilation.	
When removing the front panel or cabinet, execute short-circuit and discharge between high voltage capacitor terminals. If discharge is not executed, an electric shock is caused by high voltage resulted in a death or injury.	
Do not turn the air-conditioner ON or OFF by plugging or unplugging the power plug. There is risk of fire or electrical shock.	

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Do not use a defective or underrated circuit breaker. Use the correctly rated breaker and fuse. Otherwise there is a risk of fire or electric shock.	
Install the panel and the cover of control box securely. Otherwise there is risk of fire or electric shock due to dust, water etc.	
Indoor/outdoor wiring connections must be secured tightly and the cable should be routed properly so that there is no force pulling the cable from the connection terminals. Improper or loose connections can cause heat generation or fire.	
Do not touch, operate, or repaire the product with wet hands. Hoding the plug by hand when taking out. Otherwise there is risk of electric shock or fire.	

⚠CAUTION	
Do not turn on the breaker under condition that front panel and cabinet are removed.	
Be sure to earth the air conditioner with an earthing conductor connected to the earthing terminal.	
Conduct repair works after checking that the refrigerating cycle section has cooled down sufficiently. Otherwise, working on the unit, the hot refrigerating cycle section can cause burns.	
Do not tilt the unit when removing panels. Otherwise, the water inside the unit can spill and wet floor.	
Do not use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.	

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1.2 Inspections after Repair

⚠WARNING	
Check to see if the power cable plug is not dirty or loose. If the plug is dust or loose it can cause an electrical shock or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances. otherwise, it can cause an electrical shock, excessive heat generation or fire.	
Do not insert hands or other objects through the air inlet or outlet while the product is operating. There are sharp and moving parts that could cause personal injury.	
Do not block the inlet or outlet of air flow. It may cause product failure	

⚠CAUTION	
Check to see if the parts are mounted correctly and wires are connected. Improper installation and connections can cause an electric shock or an injury.	
Check the installation platform or frame has corroded. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Be sure to check the earth wire is correctly connected.	
After the work has finished, be sure to do an insulation tset to check the resistance is 2[Mohm] or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.	
Check the drainage of the indoor unit after the repair. If drainage is faulty the water to enter the room and wet floor.	

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2. Nomenclature

2.1 Global Model Name

A	S		W	1	2	6	4	G	G	1
1	2	-	3	4	5	6	7	8	9	10

Code	Type	Code of Model	Meaning
1	Production Center, Refrigerant	A~Z	L: Chang-won R22 A: Chang-won R410A
2	Product Type	A~Z	S: Split Type Air Conditioner
3	Cooling/Heating/Inverter	A~Z	C: Cooling Only H: Heat Pump X: C/O + E/Heater Z: H/P + E/Heater V: AC Inverter C/O N: AC Inverter H/P Q: DC Inverter C/O W: DC Inverter H/P
4, 5	Capacity	0~9	Cooling/Heating Capacity Ex. "09" → 9,000 Btu/h
6	Electric Range	1~9 A~Z	1: 115V/60Hz 2: 220V/60Hz 3: 208-230V/60Hz 5: 200-220V/50Hz 6: 220-240V/50Hz 7: 110V, 50/60Hz
7	Chassis	A~Z	Name of Chassis
8	Look	A~Z	Look, Color (Artcool Model)
9, 10	Function	A~Z	
11	Serial No.	1~9	LG Model Development Serial No.

A	Basic
B	Basic+4Way
C	Plasma Filter
D	Plasma Filter+4 Way
E	Tele+LCD
F	Tele+LCD+Nano plasma+4Way
G	NBF F+(A/changeove)+A/clean+Low A
H	NBF F+(A/changeove)+A/clean+4way+Low A
I	Tele+LED+4way
J	Internet
K	Plasma F+4Way+Oxygen generator
L	NBF F+(A/changeove)+A/clean
M	NBF F+(A/changeove)+A/clean+4way
N	NBF F+(A/changeove)+A/clean+PTC
P	NBF F+(A/changeove)+Autoclean+4way+PTC
Q	NBF F+(A/changeove)+A/clean+4way+Low A+PTC
R	Negative ion+A/Clean
S	(Nano)Plasma+Negative ion+A/Clean
T	4way+(Nano)Plasma F+Negative ion+A/Clean
U	Nano Plasma F+4Way+(A/changeove)+A/clean+Oxygen generator
V	4way+(Nano)Plasma F+Negative ion+A/Clean+Oxygen generator
W	Dry contact
Y	Basic + Low A

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1. List of Functions & Controls

Category	Function	Description	Remark
Airflow	Auto swing (left & right)	Horizontal Airflow Direction control	Optional
	Auto swing (up & down)	Vertical Airflow Direction control	Optional
	Chaos swing (up & down)	Vertical Airflow Direction control	Optional
	Airflow steps (fan/cool/heat)	Indoor Fan speed Control	
	Chaos wind (auto wind)	Indoor Fan speed Control by chaos pattern	Optional
	Jet cool (Power wind)	Powerful cooling mode	
Air purifying	Deodorizing filter	Air filtration using Deodorizing filter	
	Plasma air purifier	Air filtration using plasma filter	Optional
	Pre-filter (washable/anti-fungus)	Air filtration using pre-filter	
Reliability	Hot start	To prevent cold wind blow on heating mode start	
	Self diagnosis	Error code displays	
	Soft dry operation	Dehumidification	
Convenience	Auto changeover	Cooling mode is automatically changed to heating mode and vice verse	Optional
	Auto clean	After cooling operation, this function makes the evaporator dry	Optional
	Auto operation (artificial intelligence)	Air volume & set temp. are automatically selected for comfort on Cooling/Heating mode	Optional
	Auto restart operation	When power returns after a power failure, unit restarts in the previous operating mode	
	Forced operation	Operation without remote controller	
	Sleep mode	Air volume & set temp. are automatically changed for comfortable sleep	
	Timer (on/off)	Operation by Timer setting	
Individual control	Wireless remote controller (simple)	Wireless remote controller (simple)	Optional
Special Function & KIT	Low ambient operation	For operation at low temp.	
Other Functions & Controls	Outdoor Normal	Outdoor Control	
	Comp. control	Compressor Control	
	EEV control	EEV Control	
	FAN control	FAN control	
	Oil Return Control	Oil Return Control	
	Oil equalizing	Oil equalizing Control	
	Sump Heating	Sump Heating Control	
	Protection Control	Protection Control	
	Inverter protection	Inverter protection	
	Defrost / Deicing	Condenser frost prevention	
	High pressure switch	Detect high pressure for safety	Optional
	Low pressure switch	Detect low pressure for safety	Optional
	Phase protection	Misconnection prevention for three phase	Optional
	Restart delay (3-minutes)	For overload prevention	Optional
	Self diagnosis	Error code displays	
	Soft start	Soft start for compressor	Optional
	Test function	Test operation	

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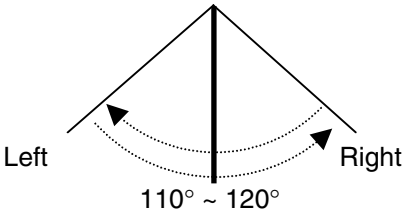
2. Air flow

* Some Models are different with swing width and swing pattern.

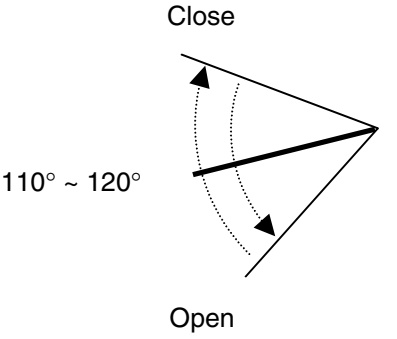
2.1 Auto swing (left & right)

• By the horizontal airflow direction control key input, the left/right louver automatically operates with the auto swing or it is fixed to the desired direction.



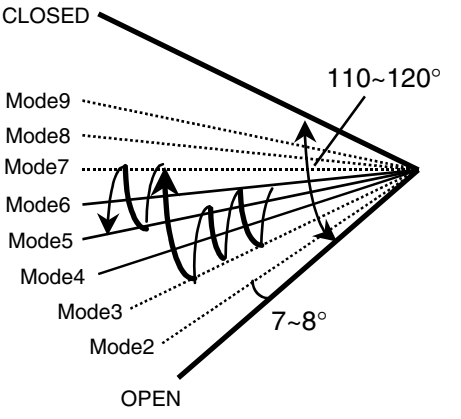
2.2 Auto swing (up & down)

• By the auto swing key input, the upper/lower vane automatically operates with the auto swing or it is fixed to the desired direction.



2.3 Chaos swing (up/down)

• By the Chaos swing key input, the upper/lower vane automatically operates with the chaos swing or it is fixed to the desired direction.



NOTE: Some Models are different by swing width and swing pattern.

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2.4 Air flow step

- Indoor fan motor control have 6 steps.
- Air volume is controlled "SH", "H", "Med", Low" by remote controller.
- "LL" step is selected automatically in Hot start operation.

Step	Discription
LL	Very low, In heating mode
L	Low
M	Med
H	High
SH	Super high
Auto	Chaos wind

2.5 Chaos wind (auto wind)

- When "Auto" step selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec. randomly by the Chaos Simulation

2.6 Jet Cool Mode Operation

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input.
  When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min. at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C.
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

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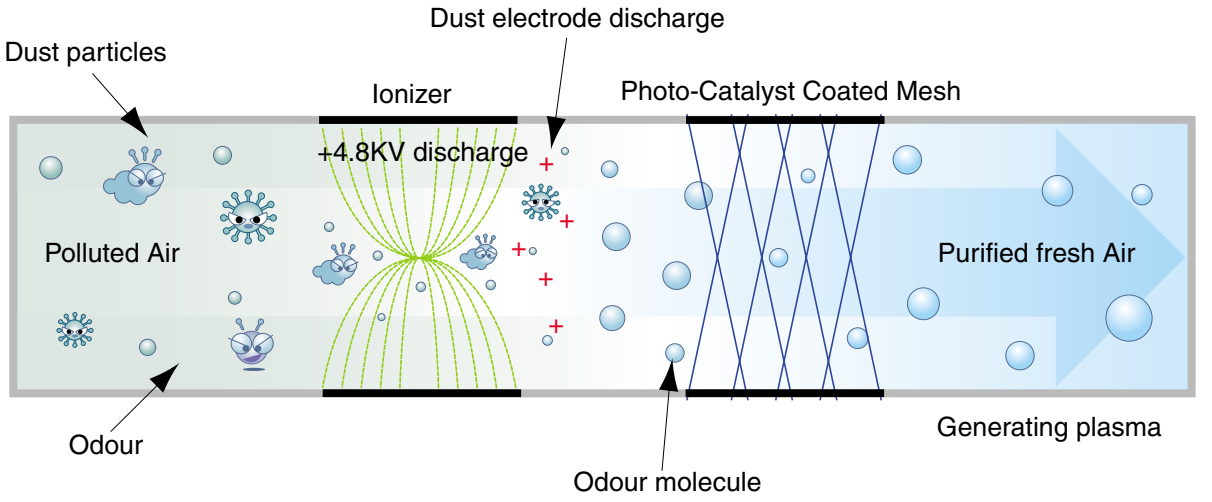
3. Air purifying

3.1 PLASMA Air Purifying System

The PLASMA Air Purifying System not only removes microscopic contaminants and dust, but also removes house mites, pollen, and pet fur to help prevent allergic diseases like asthma. This filter that can be used over and over again by simply washing with water.



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4. Reliability

4.1 Hot start

- When heating is started, the indoor fan is stopped or very slow to prevent the cold air carry out
- When the temp. of heat exchanger reach 30°C(model by model), indoor fan is started.

4.2 Self-diagnosis Function

- The air conditioner installed can self-diagnosed its error status and then transmits the result to the central control. Therefore, a rapid countermeasure against failure of the air conditioner allows easy management and increases the usage life of air conditioner.
- Refer to trouble shooting guide.

4.3 Soft dry operation

- When the dehumidification operation input by the remote control is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.

Intake air Temp.	Setting Temp.
26°C ≤ intake air temp.	25°C
24°C ≤ intake air temp.< 26°C	intake air temp. -1°C
22°C ≤ intake air temp. < 24°C	intake air temp. -0.5°C
18°C ≤ intake air temp. < 22°C	intake air temp.
intake air temp. < 18°C	18°C

- While compressor off, the indoor fan repeats low airflow speed and stop.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat.

  Compressor ON Temp. ➔ Setting Temp+0.5°C
  Compressor OFF Temp. ➔ Setting Temp-0.5°C

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by Micom Control.

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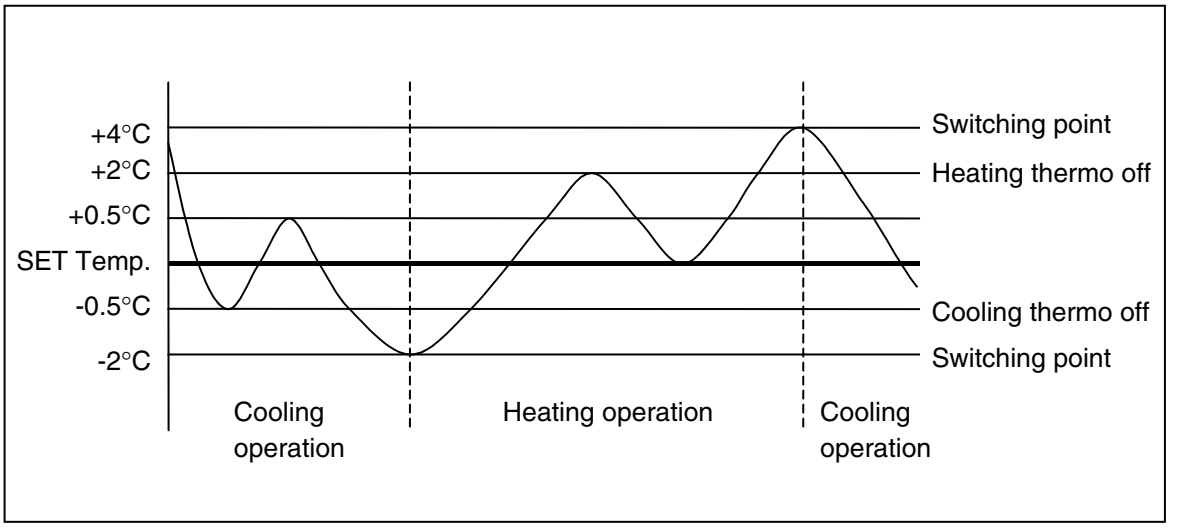
5. Convenience Functions & Controls

5.1 Auto changeover operation

- The air conditioner changes the operation mode automatically to keep indoor temperature.
- When room temperature vary over ±2°C with respect to setting temperature, air conditioner keeps the room temperature in ±2°C with respect to setting temperature by auto change mode.



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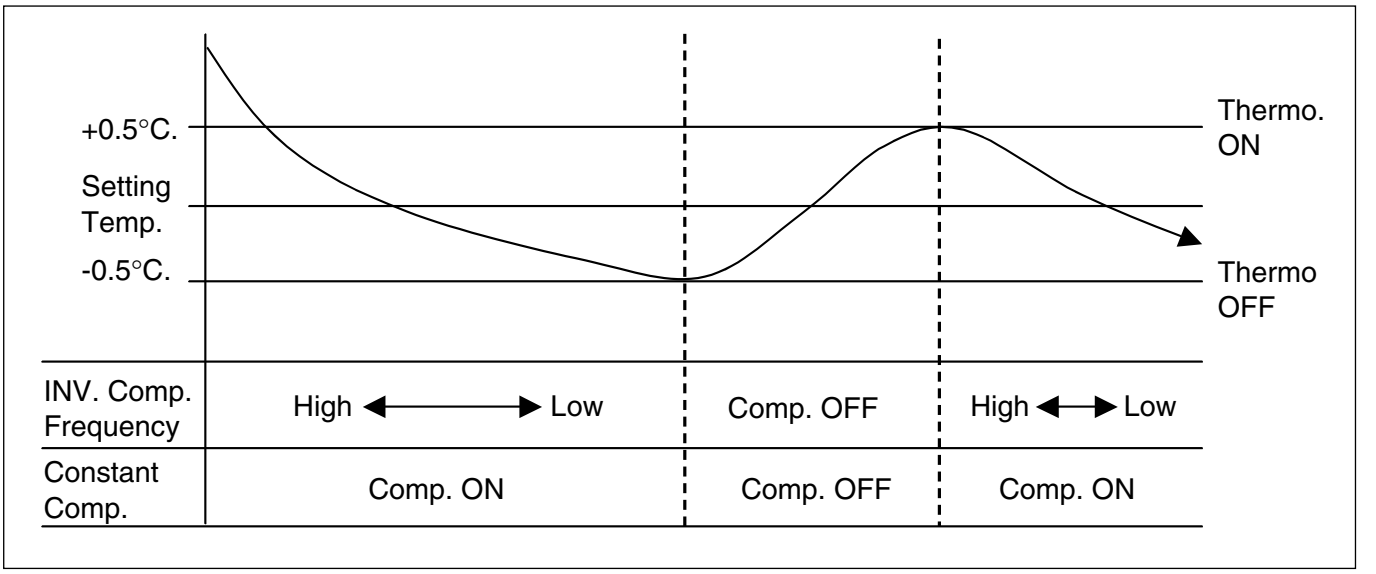
■ Cooling & heating Opeattions

5.1.1 Cooling Mode



- Operating frequency of compressor depends on the load condition, like the difference between the room temp. and the set temp., frequency restrictions.
- If the compressor operates at some frequency, the operating frequency of compressor cannot be changed within 30 seconds. (not emergency conditions)
- Compressor turned off when
  - intake air temperature is in between ±0.5°C of the setting temp. limit for three minutes continuously.
  - intake air temperature reaches below 1.0°C of the temperature of setting temp..
- Compressors 3 minutes time delay.
  - After compressor off, the compressor can restart minimum 3 minutes later.
  - Compressor operating range is form 40% to 110% of rated condition.

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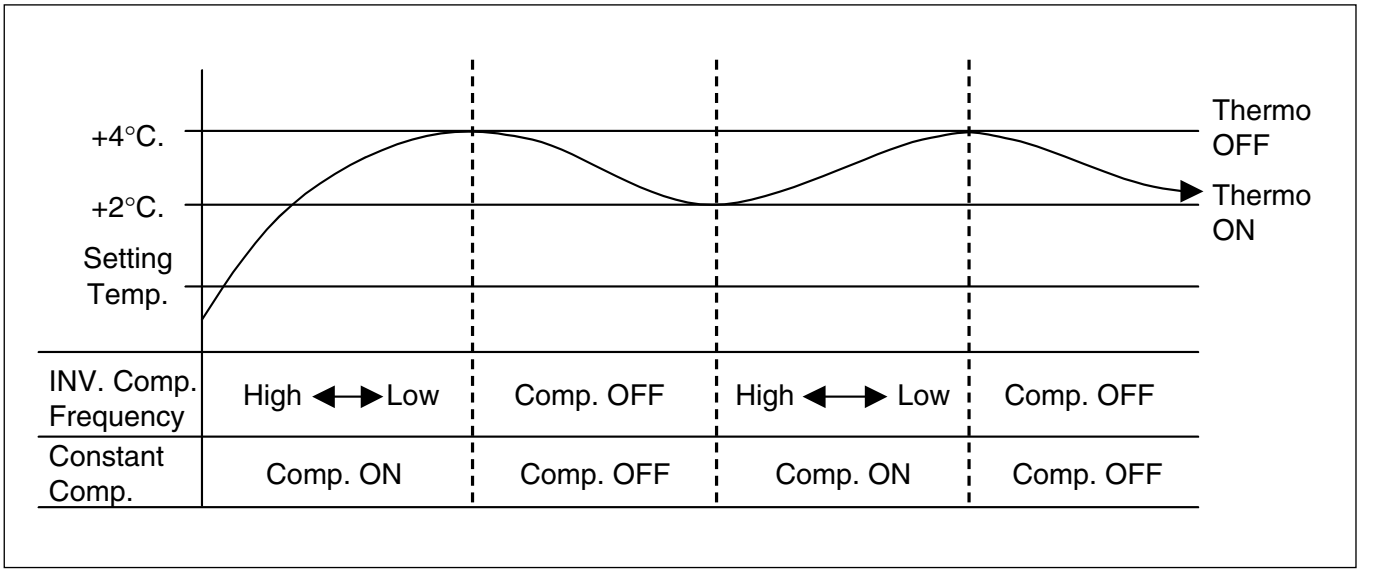
5.1.2 Heating Mode



- Operating frequency of compressor depend on the load condition, The difference between the room temp. and set temp., frequency restrictions.
- If compressor operates at some frequency, the operating frequency of compressor cannot be changed within 30 seconds.
- Condition of compressor turned off
  - When intake air temperature reaches +4°C above the setting temperature.
- Condition of compressor turned on
  - When intake air temperature reaches +2°C above the setting temperature.

* Condition of indoor fan turned off
  - While in compressor on : indoor pipe temp. < 20°C (Option)
  - While in compressor off : indoor pipe temp. < 30°C (Option)

- While in defrost control, between the indoor and outdoor fans are turned off.
- Compressor 3 minutes delay
  - After compressor off, the compressor can restart minimum 3 minutes later.

NOTE: Some Models are different by temperature of thermo ON/OFF.

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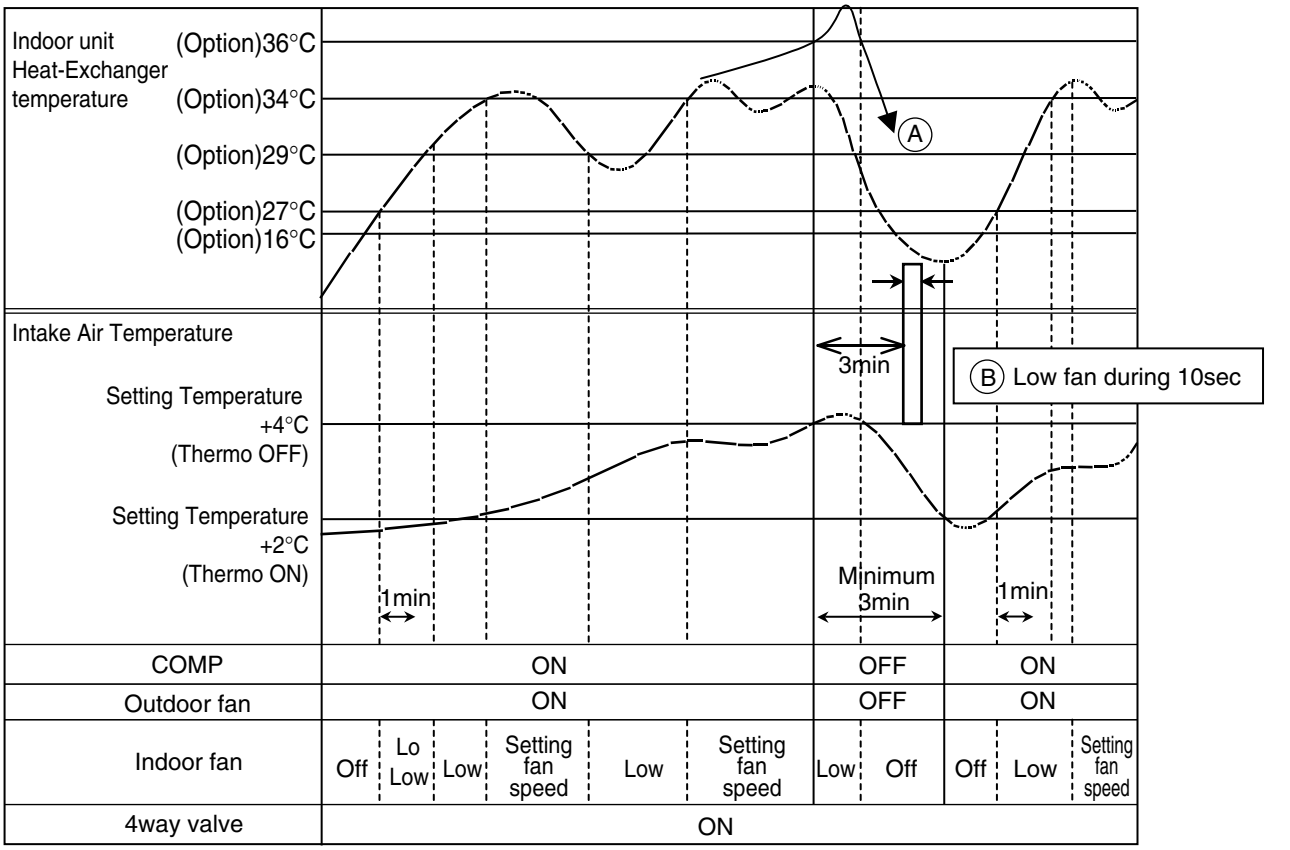
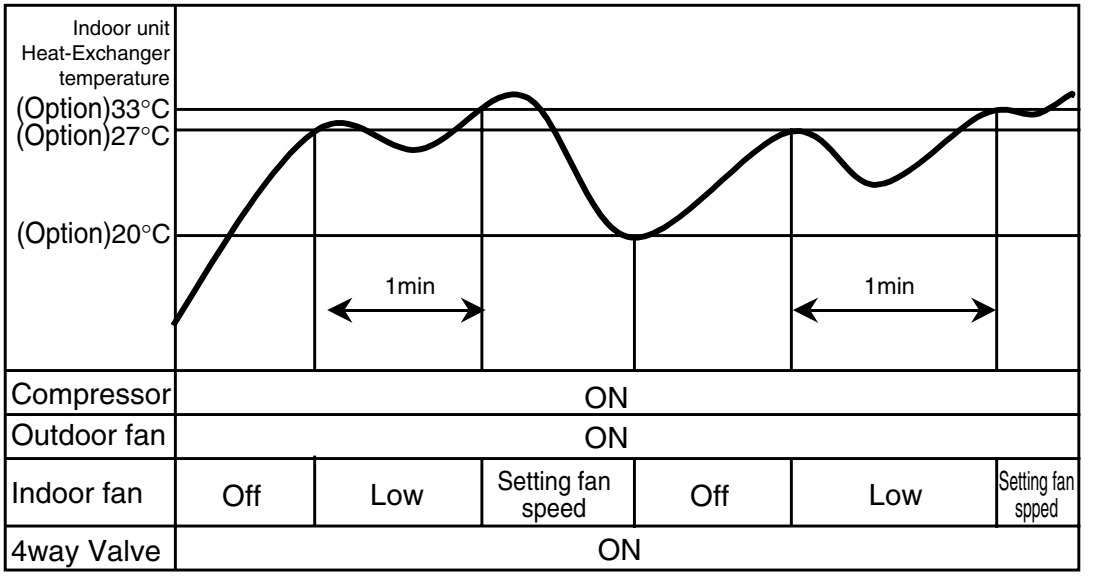
* Some Models are different with temperature of indoor fan ON/OFF

■ Heating Mode Operation Details

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.



• **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 27°C, fan operates at low speed, when it becomes lower than 26°C fan stops.
- (B) For eleminating latent heat-loss, fan operates at low speed for 10 seconds periodically.



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5.2 Forced operation

- To operate the appliance by force in case when the remote control is lost, the forced operation selection switch is on the main unit of the appliance, and operate the appliance in the standard conditions.
- The operating condition is set according to the outdoor temp. and intake air temperature as follows.

Indoor temp.	Operating Mode	Setting temp.	Setting speed of indoor fan
over 24°C	Cooling	22°C	High speed
21~24°C	Healthy Dehumidification	22°C	
below 21°C	Heating	22°C	

- The unit select the last operation mode in 3 hours.

- Operating procedures when the remote control can't be used is as follows :
  - The operation will be started if the ON/OFF button is pressed.
  - If you want to stop operation, re-press the button.

5.3 Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote control while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

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1. Compressor

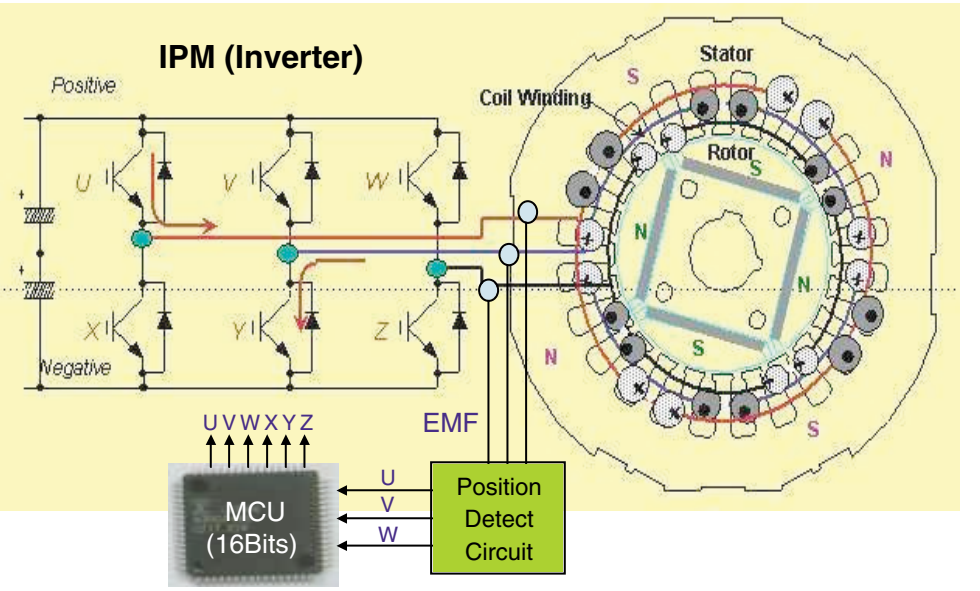
1.1 Basic principle

Basic principle is to control the rpm of the motor by changing the working frequency of the compressor.
Three phase voltage is supplied to the motor and the time for which the voltage will supplied is controlled by IPM (intelligent power module).
Switching speed of IPM defines the variable frequency input to the motor.

$$RPM = \frac{120\ f}{P}$$

RPM → Revolutions/Minute
F → Frequency
P → Number of poles

BLDC Motor



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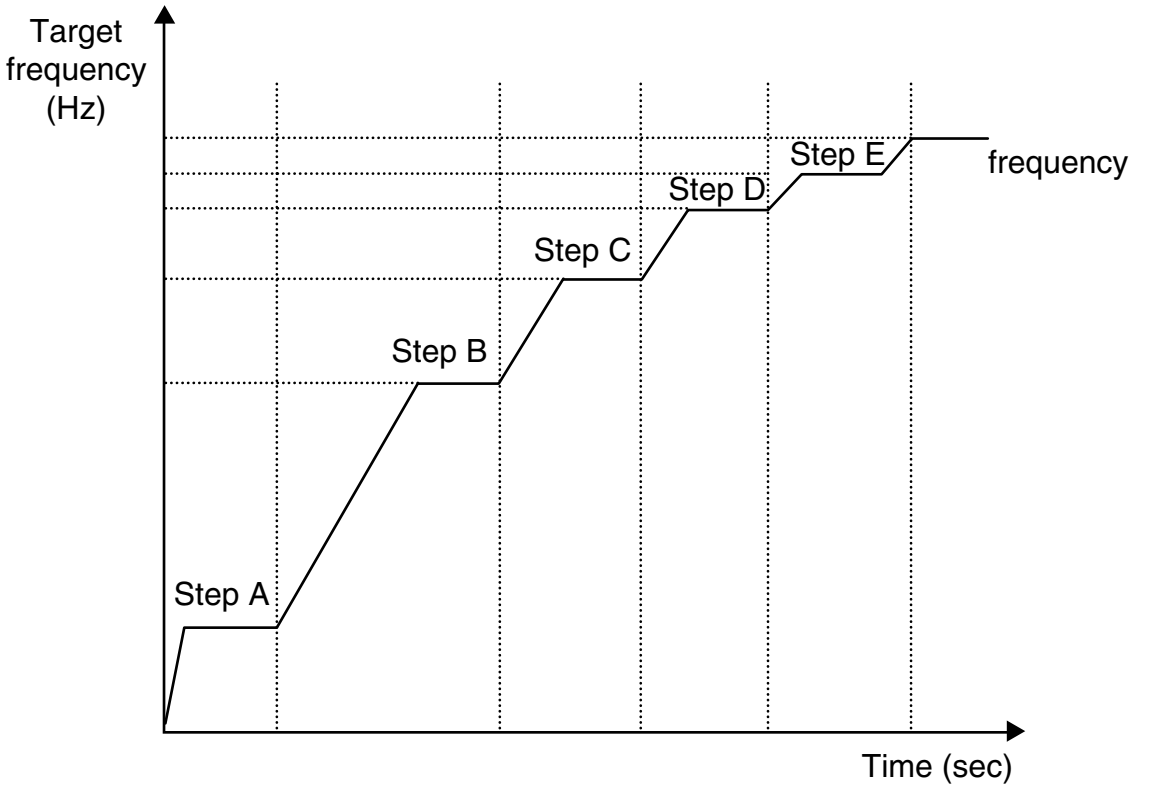
1.2 Inverter compressor starting

: Target Step calculation method

- Step A = Step 1 Frequency (Min. frequency : 20~25Hz)
- Step B = (Step A + Target STEP) / 2
- Step C = (Step B + Target STEP) / 2
- Step D = (Step C + Target STEP) / 2
- Step E = (Step D + Target STEP) / 2



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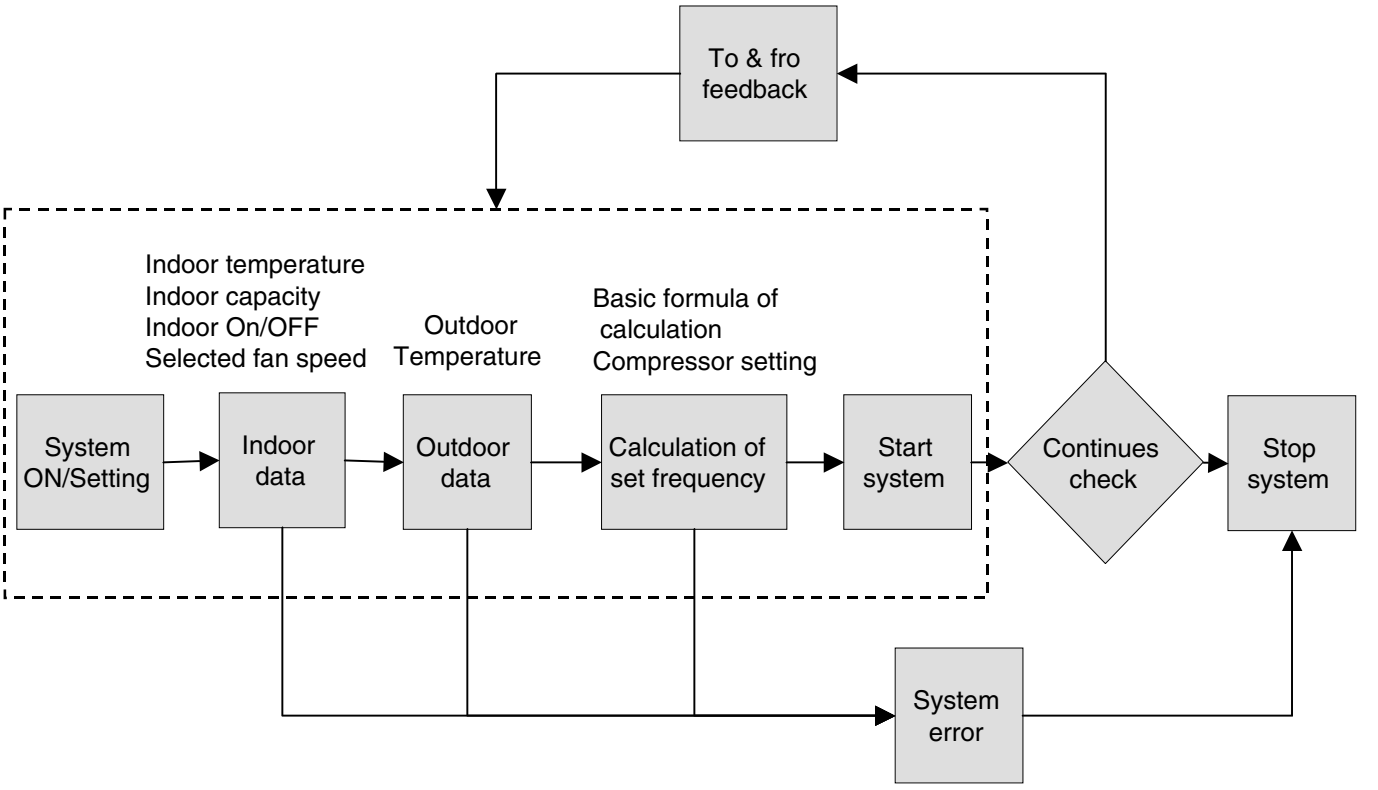
2. Step(frequency) control

2.1 Frequency control

Frequency that corresponds to each rooms capacity will be determined according to the difference in the temperature of each room and the temperature set by the remote controller.
There are various factors determining the frequency.

1. Indoor unit capacity value.
2. Temperature compensation factor
3. Initial frequency setting



2.2 Primary step setting

: Capacity steps of compressor are decided by ∑Qj (Summation of capacity code), TA0(Outdoor temp.), TAI(Indoor temp.), DTAI (Step Compensation of temperature difference Indoor Temp. and Setting Temp.

Comp Step = (Step base+Long piping compensation) x ΔStep TAO x ΔStep TAI x ΔStep DTAI

Step base	Standard frequency step by ∑Qj (Summation of capacity code)
Long piping	Comp. Step compensation by setting long piping
ΔStep TAO	step compensation by TAO (Outdoor temp.)
ΔStep TAI	step compensation by TAI (Indoor temp.)
ΔStep DTAI	Step Compensation of temperature difference Indoor Temp. and Setting Temp.

✻ Target frequency step (Step base) exceeds maximum step, the Step base value follows the maximum step value.

✻ The compressor get the minimum step in case Step base value is lower than the minimum step of operating capacity.

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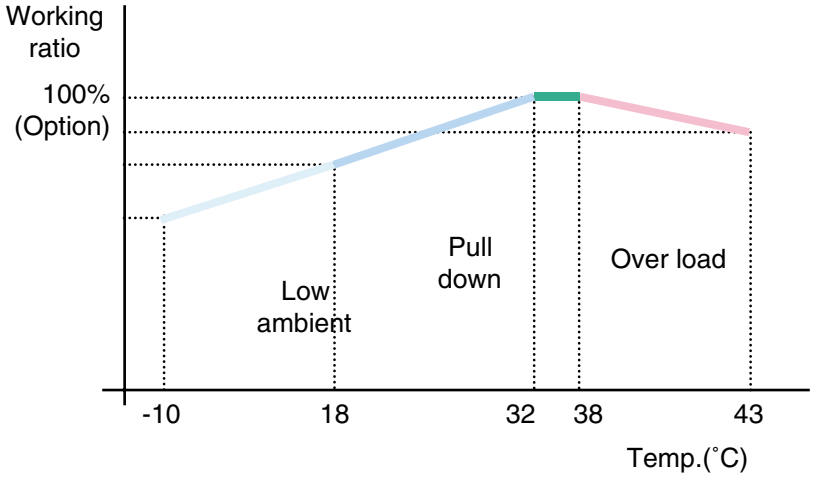
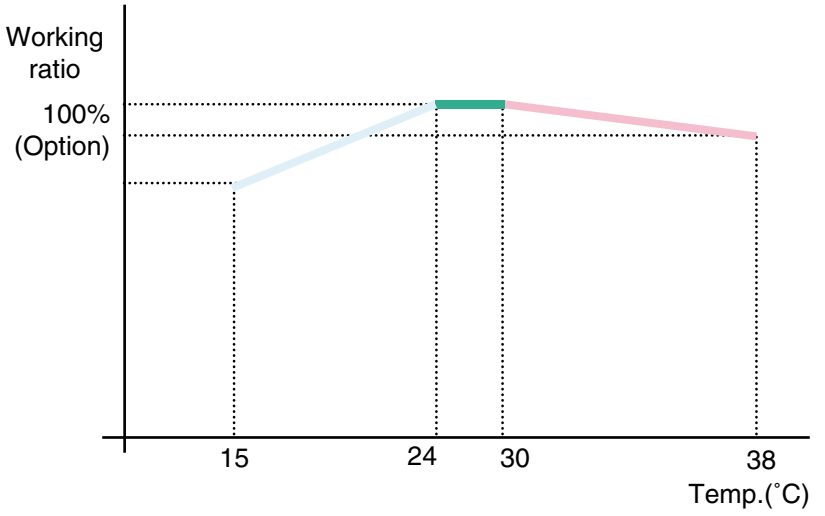
2.3 Setting value / Cooling

∆Step TAO : step compensation by Outdoor temp.



∆Step TAI: step compensation by Indoor temp.



∆Step DTAI : Step Compensation of temperature difference between indoor temp. and setting temp. (40-110%)

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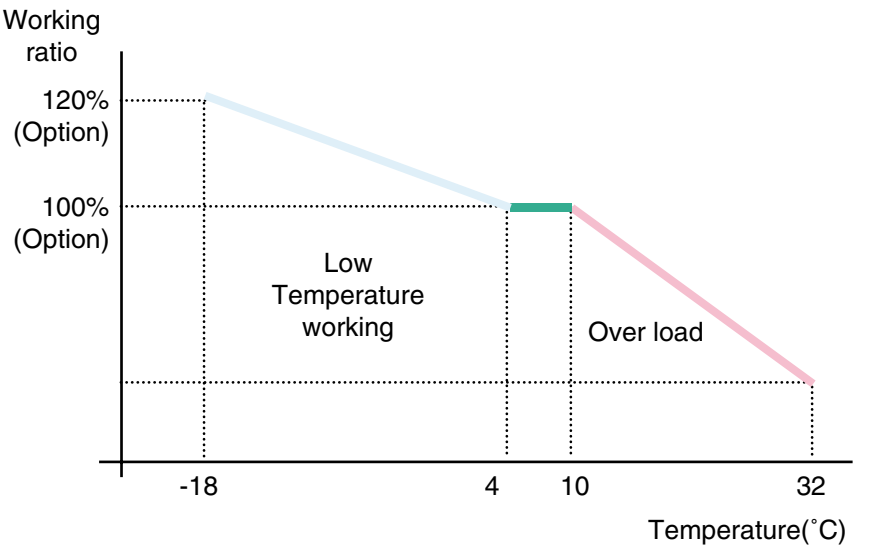
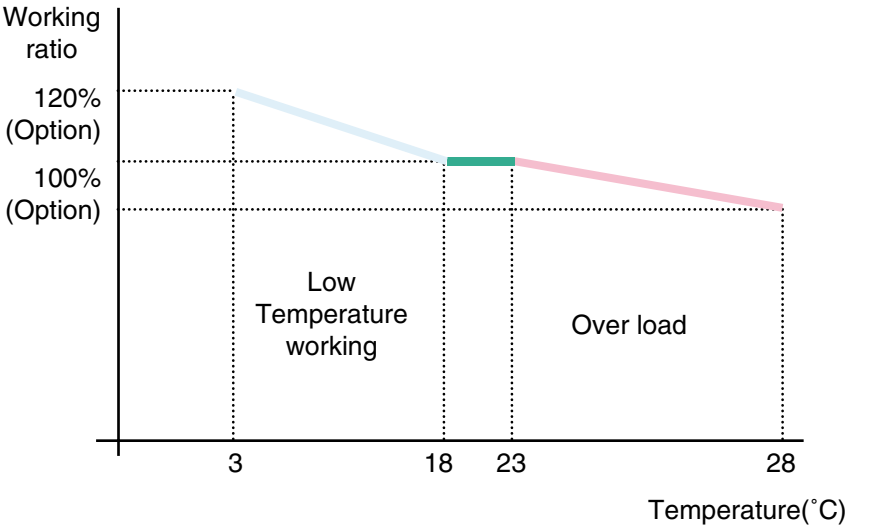
2.4 Setting value / Heating

∆Step TAO : step compensation by Outdoor temp.



∆Step TAI: step compensation by Indoor temp.



∆Step DTAI : Step Compensation of temperature difference between indoor temp. and setting temp (40-110%).

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3. Reversing valve operation

1. At the starting (outdoor is powered on,indoor is not) reversing valve continues OFF(cooling).
2. For the cooling and defrosting operation :valve OFF, for the heating operation :valve ON
3. Method of changing mode from heating to defrosting : As defrosting starts Inverter compressor Hz is lowered to 30Hz for 5 sec and the valve is OFF for the defrost mode. (refer “working process of each component in defrosting and returning to heating mode ”)
4 . Method of changing mode from defrosting to heating : As the defrosting is finished inverter compressor frequency is lowered to 30Hz for 10 sec. And the valve is ON for the heating mode.
5. If the operating mode is changed to heating from cooling, “3 min. restarting rule” is applied, and reversing valve position is changed within 30 sec. after compressor turns OFF.
6. If the compressor is stopped during heating mode by remote controller operation or error mode, reversing valve position is changed to OFF in 30 sec. after compressor turns OFF.
7. If the compressor is stopped during heating mode by Thermistor signal, reversing valve will remain in heating position.

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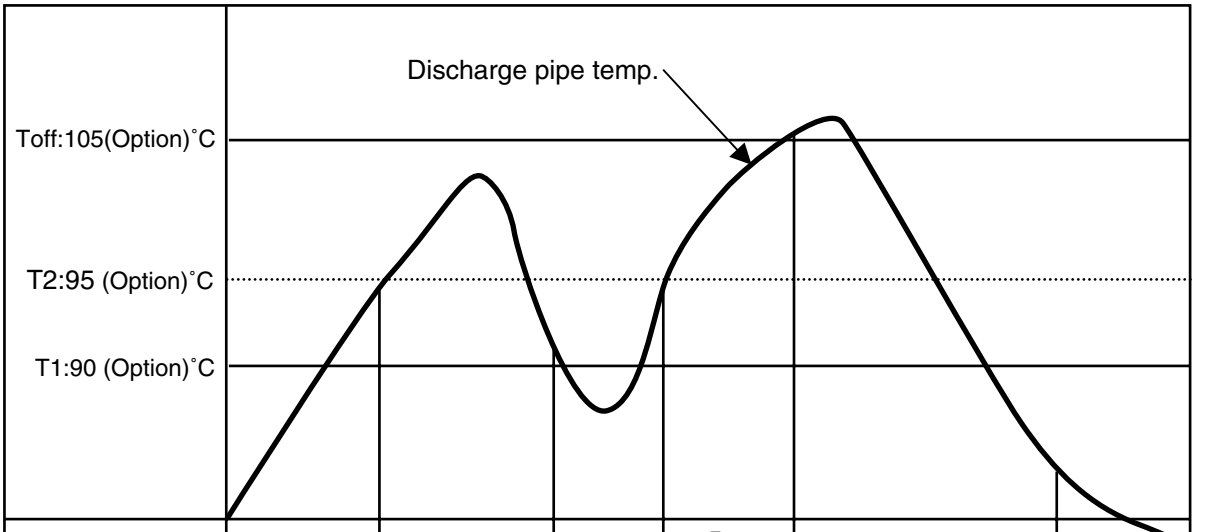
4. Discharge pipe control

1) There can be two situations
   a) Sensor is failed (error code for sensor failure will be generated)
   b) Abnormal high temperature discharge temperature (error code for high discharge will be generated)
   Both cases unit will stop.

Compressor working

1. If discharge pipe temperature £º T1 No limitation on compressor frequency
2. T2 ≤ discharge pipe temperature £º Toff (Hysteresis control) Compressor frequency down by 5 pulse & Expansion valve up by 10 pulse in every 1 min. If LEV is in the starting control it will follow starting control first.
3. discharge pipe temperature ≥ Toff then compressor will be OFF System will stop if this situation occurs 5 times in 1 hour and error code will be generated also self diagnosis will start.



COMP Hz	Set	5Hz(Option) Down	Set	5Hz (Option) Down	OFF	Set
Expansion valve	Set	10 pulse (Option) up	Set	10 pulse (Option) up	Stop control	Set

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5. Input Current Control

5.1 Function

Controlling total current to protect power semiconductor devices from burn-out by the low current (including connecting mistake) and over current.

Operating process

1. Detection : check the output DC voltage of Current Transformer(CT).
2. Current Transformer Sensing Error
   1) In initial power input, if the CT output is over 4.0V (25A)
      it shows Self-Diagnosis Error Mode 40
      (defect in CT1 or CT2 detection)

5.2 Operating process

CT 1 detection :

1) If total current exceeds CT1 value, reduce inverter operation by 1 step.
   - Step down 10Hz from current step.
   - If new Hz is below minimum Hz of operation (cooling & heating), then turn off the compressor.
2) After step down, still if the total current exceed CT1 for more than 5 sec.
   then step down inverter operation by 1 more step.
3) If the current continue below CT1 for more than 1 min., return the to setting step Hz.

CT 2 detection :

1) If total current exceeds CT2 turn off compressor.
   And after 3 min turn on the compressor and check the current again.
2) If CT2 occurs 5 times in 1 hour,stop the operation and shows Self-Diagnosis Error Mode 22

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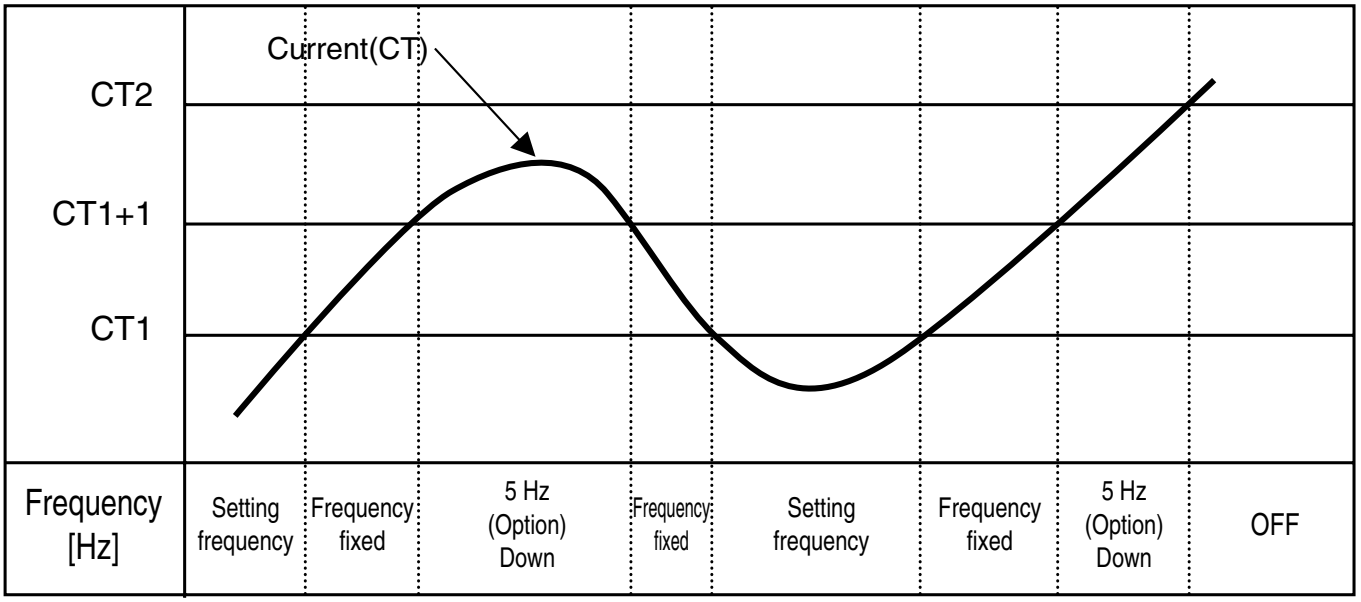
Model		Cooling		Heating	
		CT1	CT2	CT1	CT2
1 Phase	ASUW306DGM0	16	19	17	19
	ASUW366DGM0	16	19	17	19



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6. Outdoor Fan Control

6.1 Function

Working of outdoor fan are different in different models.
Some models are single fan some are two fan type.

6.2 Operating process

Control logic of outdoor fan depends on outdoor temperature

1. DC motor fan control

Model		RPM		
		Base Step	Max Step	Min Step
1 Pahse	ASUW306DGM0	670	700	200
	ASUW366DGM0	950	1000	200

Outdoor Temperature	Cooling Step	Outdoor Temperature	Heating Step
41~46˚C	Base Step+2	22~26˚C	Base Step-4
38~41˚C	Base Step+1	18~22˚C	Base Step-3
28~38˚C	Base Step	14~18˚C	Base Step-2
24~28˚C	Base Step-1	10~14˚C	Base Step-1
18~24˚C	Base Step-2	4~10˚C	Base Step
14~18˚C	Base Step-3	0~4˚C	Base Step+1
9~14˚C	Base Step-4	-4~0˚C	Base Step+2
2~9˚C	Base Step-5	-8~-4˚C	Base Step+2
-3~2˚C	Base Step-6	-15~-8˚C	Base Step+2

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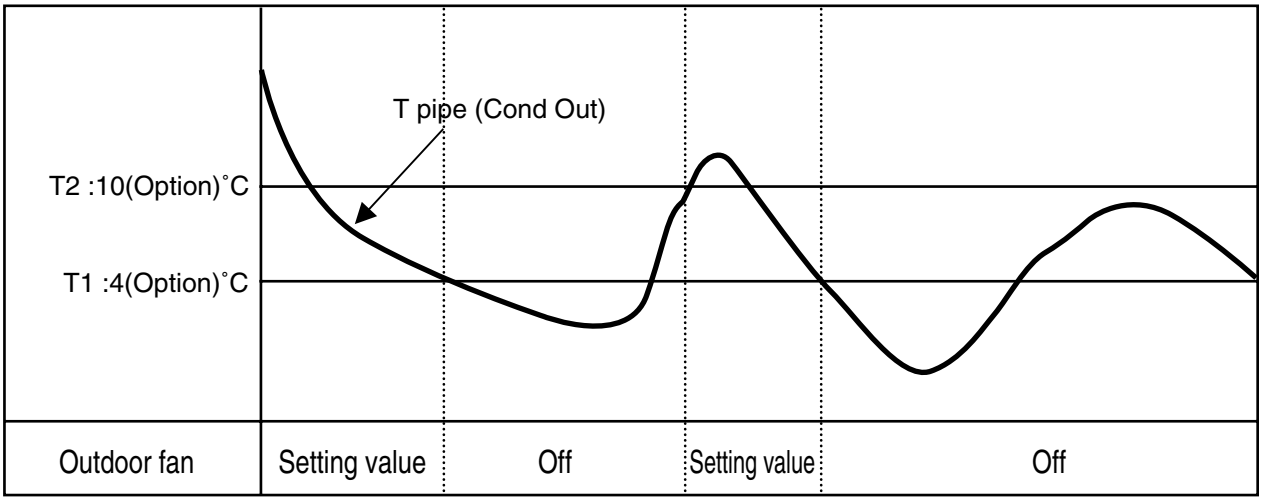
Low ambient cooling: In this situation outdoor fan works in ON/OFF control.

If the pipe temperature is 0~10∞C and it is falling rapidly in that case compressor will run for 5 min & then it will go in low ambient control.

After the system is stopped by CT cut or heat sink cut-off, cycle will return to the normal operating control.



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7. Defrost Control

7.1 Function

:These are about the control of compressor, fan of outdoor unit, reversing valve, LEV.

7.2 Starting to the defrosting operation

A) Defrost operation will be start when all the conditions below are matched simultaneously
Accumulation time of operation and the period after completion of defrost = 35min (Outdoor air temperature –3˚C)

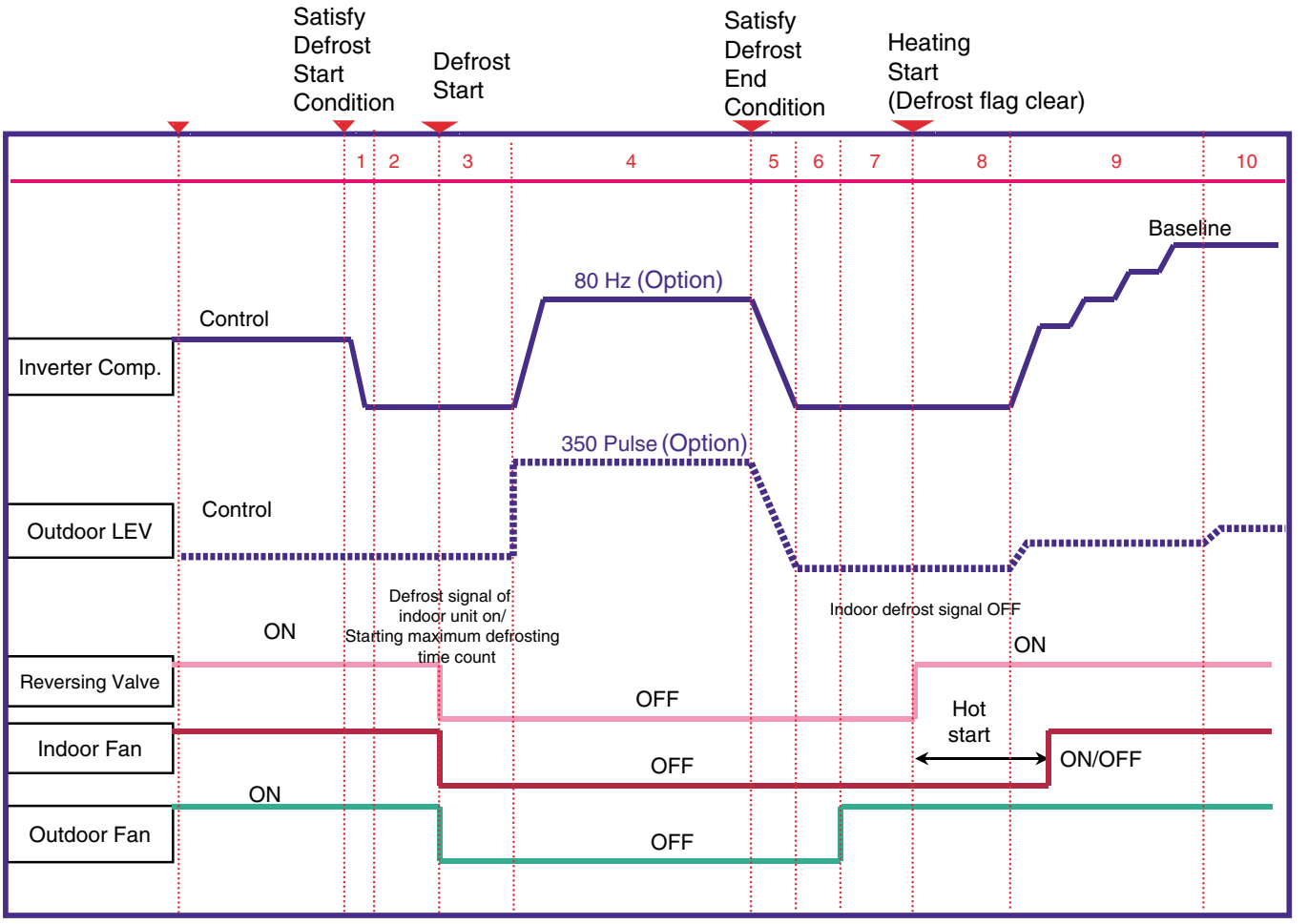
B) Outdoor piping temperature is below than –6 (Option)˚C for starting defrosting operation.

7.3 Completion of defrost operation

Send signal of defrost completion in case of meeting one of the condition as below.

1. Defrosting time £æ 7 minutes
2. Piping temperature maintain 10 seconds (Option) in condition of more than 15˚C (Option).

7.4 Defrosting Control Algorithm



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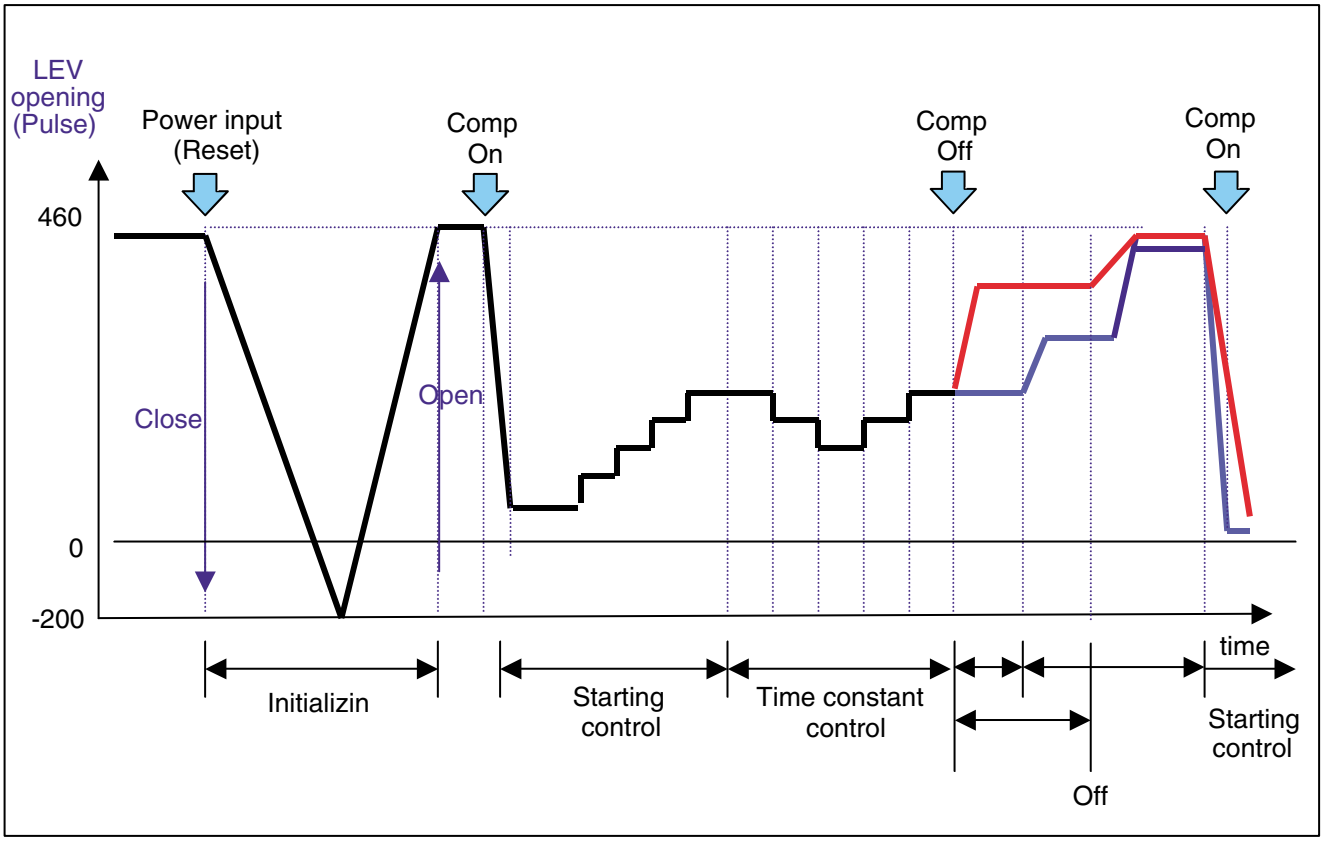
8. LEV Control

8.1 Control of LEV opening

1. LEV openings have a controllable ranges 70 (option) to 460 (option) pulse in both condition of cooling and heating.
2. Products do not be operated before initializing of LEV when starting.
3. Time constant control period of LEV is every 2 minutes except below conditions.
   - Control LEV every 1 minutes for 10 minutes after starting.
   - When indoor capacity changed, Control LEV every 1 minutes for 10 minutes after starting
   - Control LEV every 1 minutes for 10 minutes after starting in case of the special situation such as defrost completion, oil recovery, oil equalizing control, oil supplying, current transformer limitation, limitation of discharge temperature, low ambient operation control.



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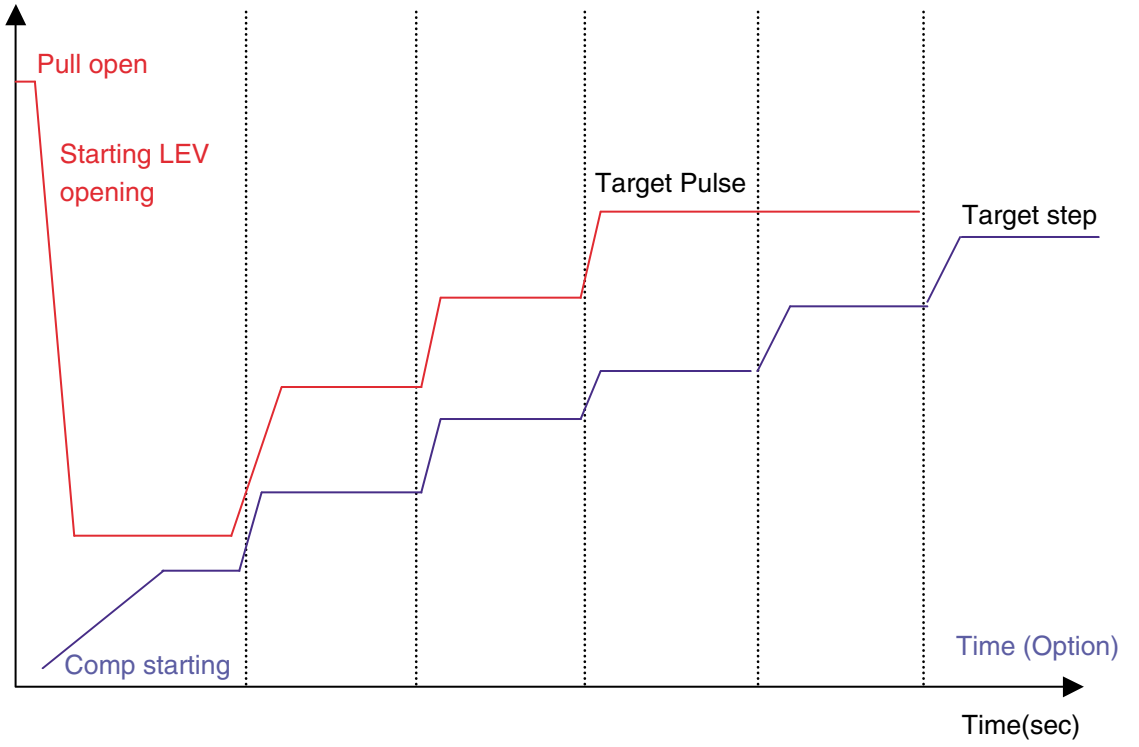
8.2 Starting control (210 sec)

1) Only 1 LEV will be operate as below and others are closed fully.
2) Starting control does not use the time when the system operate with partial load after (example) after finishing starting control for 1 indoor unit, another indoor unit is ON additionally is operated with target opening of LEV.
3) The indoor units which are in the middle of starting control are continuing starting control with the opening of its opening.
4) Urgent control by indoor piping temperature
   1. LEV open 4 pulse with every 10 sec when the indoor piping temperature is below 2˚C
   2. When the temperature reaches 4˚C, system return to the starting control pulse value.



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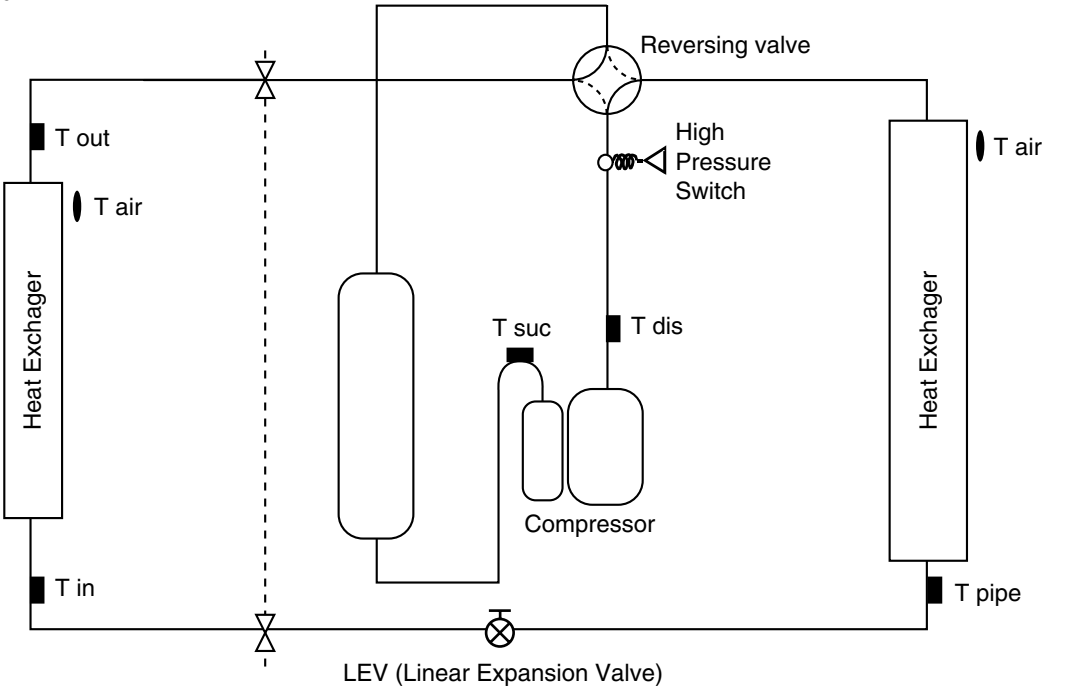
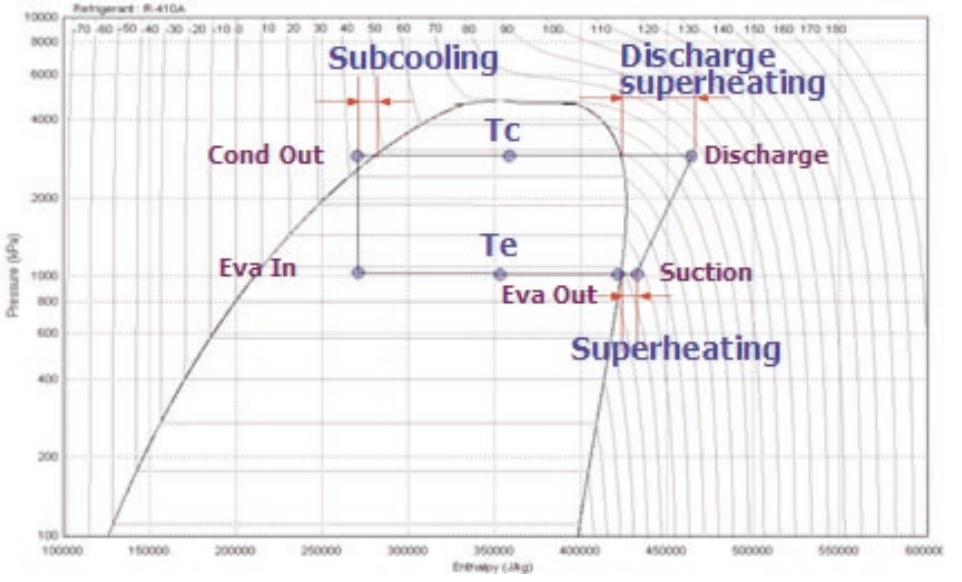
8.3 Steady state control

• Cycle diagram



• P-h diagram



	Cooling mode	Heating mode
T out	Evaporator outlet	Condenser inlet
T in	Evaporator inlet	Condenser outlet
T pipe	Condenser out	Evaporator inlet
T suc	Compressor suction	Compressor suction
T disp	Compressor discharge	Compressor discharge

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• Cooling Mode

1) Superheating control (Main control)

- Superheating : T superheating = Tout – Tin = 2˚C(Option)
- LEV pulse up : T superheating > 2˚C
- LEV pulse down : T superheating < 2˚C

2) Discharge Superheating Control (Reliability control)

- Dis Superheating : T dis_superheating = T dis – T pipe > 20˚C(Option)
- LEV pulse down : T dis_superheating < 20 (Option)˚C

  T dis_superheating > 24(Option)˚C → Back to main control

• Heating Mode

1) Superheating control (Main control)

- Superheating : T superheating = Tsuc – Tpipe = 1˚C(Option)
- LEV pulse up : T superheating > 1˚C
- LEV pulse down : T superheating < 1˚C

2) Discharge Superheating Control (Reliability control)

- Dis_Superheating : T dis_superheating = T dis –((Tin+Tout)/2)> 15˚C(Option)
- LEV pulse down : T dis_superheating < 15˚C

  T dis_superheating > 20˚C → Back to main control

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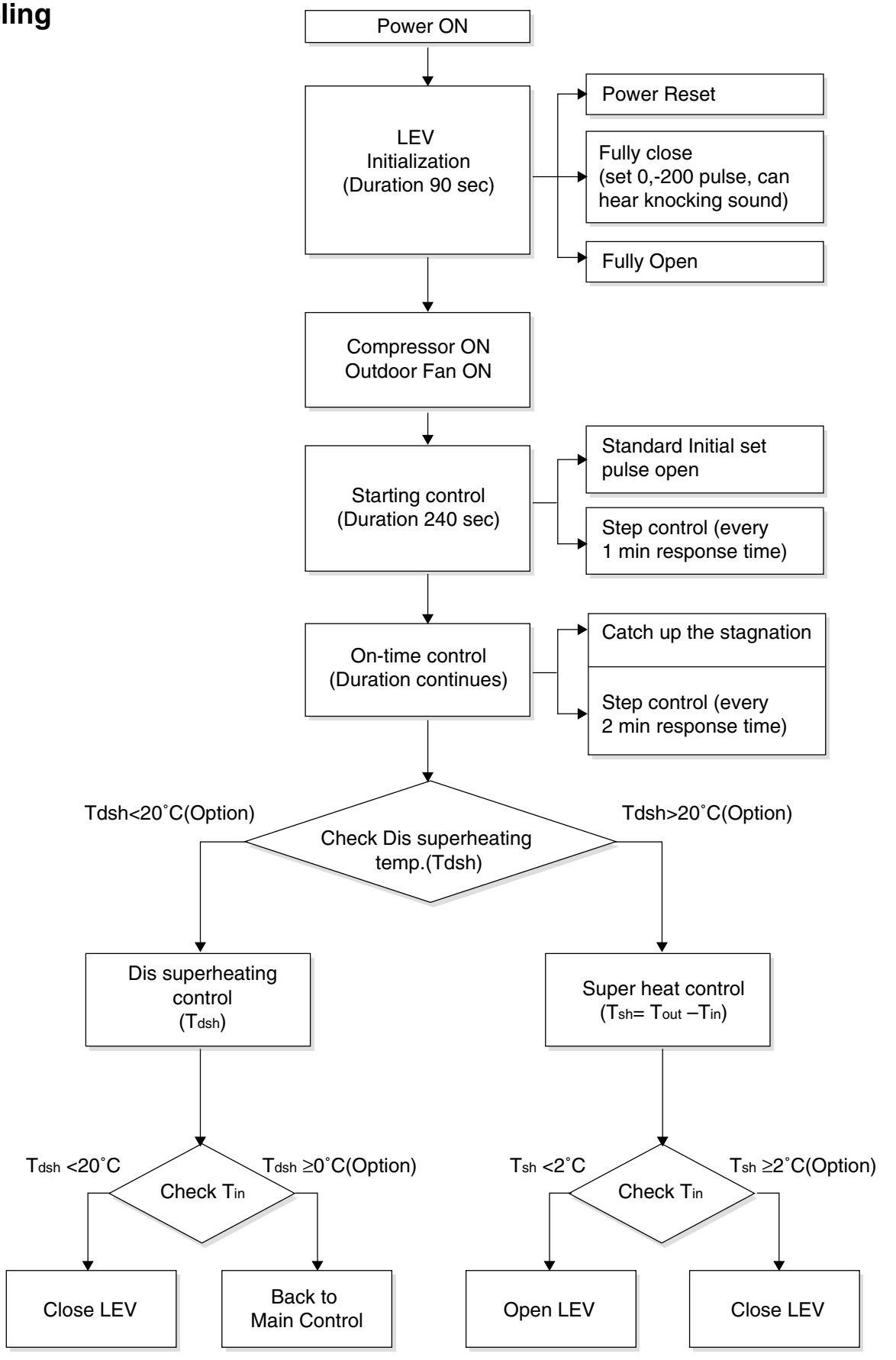
8.4 Flow Chart

• Cooling



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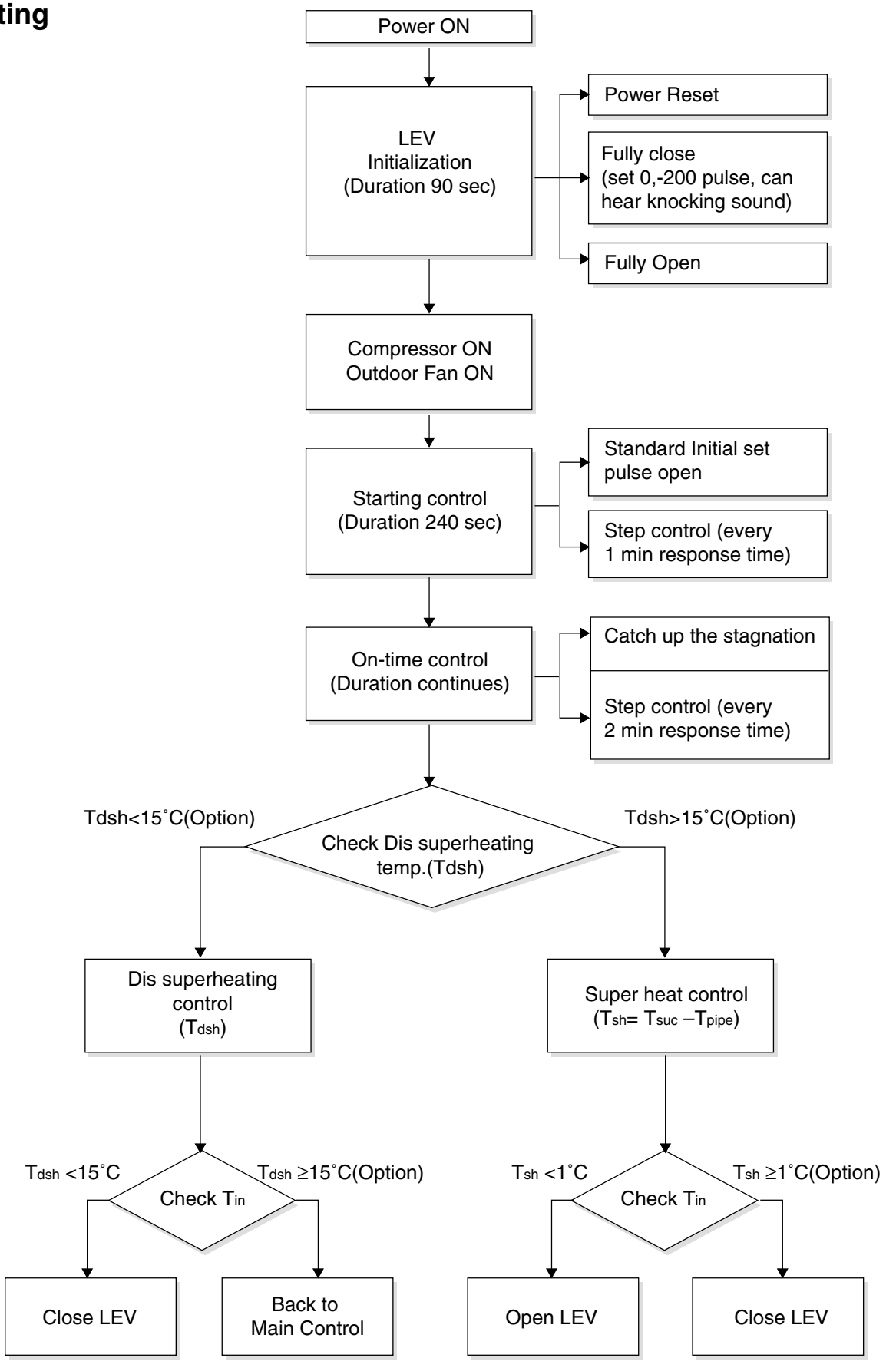
• Heating



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9. Oil restoration operation

1) When the accumulated compressor running time is over 3 hr.(option), oil restoring operation is made for 3 minutes. If it's on the way of compressor starting,it's made after the starting.
2) Accumulated running time is cleared after the defrosting and oil restoring operation.

Operating process :

1) Fully open all the indoor's LEV.
2) After the LEV opening,change the compressor step to 70 Hz(option)
3) Reversing valve will be same as in defrosting process.
4) Outdoor fan operates in low speed.
5) During this operation, if operating frequency should be changed by safety control. then follow safety control first. If compressor should be OFF by that,stop operation.
6) The LEV openings after this operation is 120% of the opening at the point of starting.

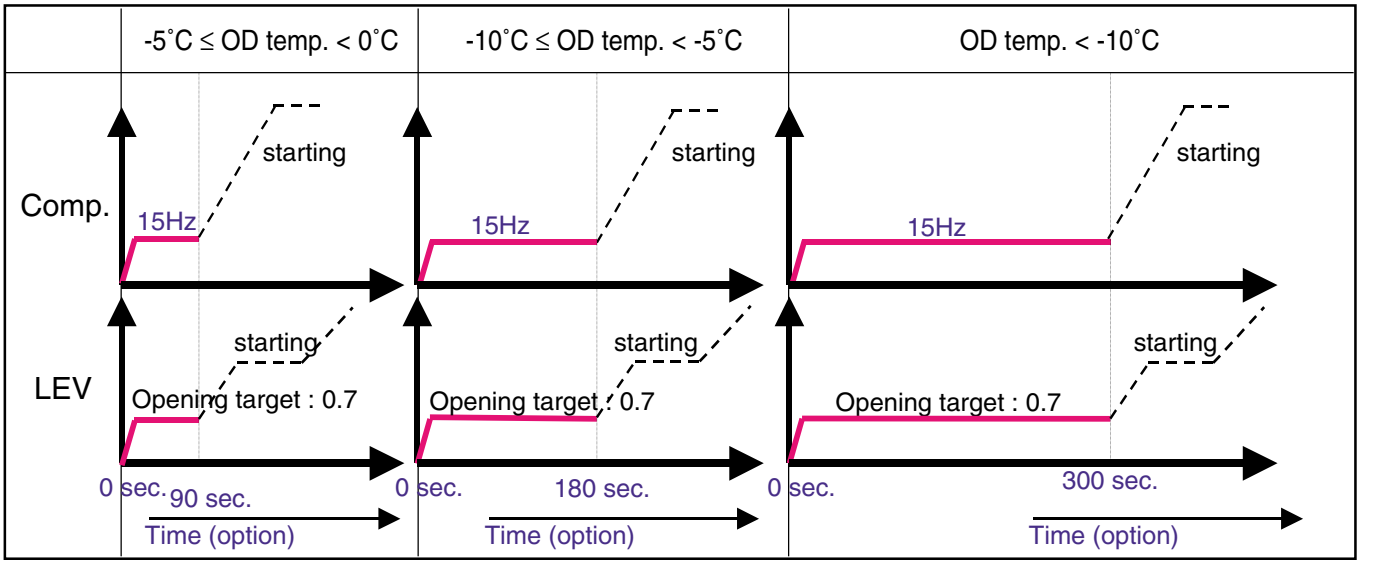
10. Compressor warm-up control logic (at low temperatures)

A function protecting inverter compressor from damages, by increasing oil viscosity in low outdoor temperature.

For the control,compressor operates in low frequencies.

Operating condition :in case of the following 3 conditions are fulfilled at the same time

- Outdoor temperature ,D-pipe temperature, Heat sink temperature: below 0˚C



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11. Heat sink control

11.1 Function

: Power module failure protection by checking the temperature of heat sink.
There is a temperature sensor for checking the heat sink temperature.

11.2 Heat sink sensor failure error

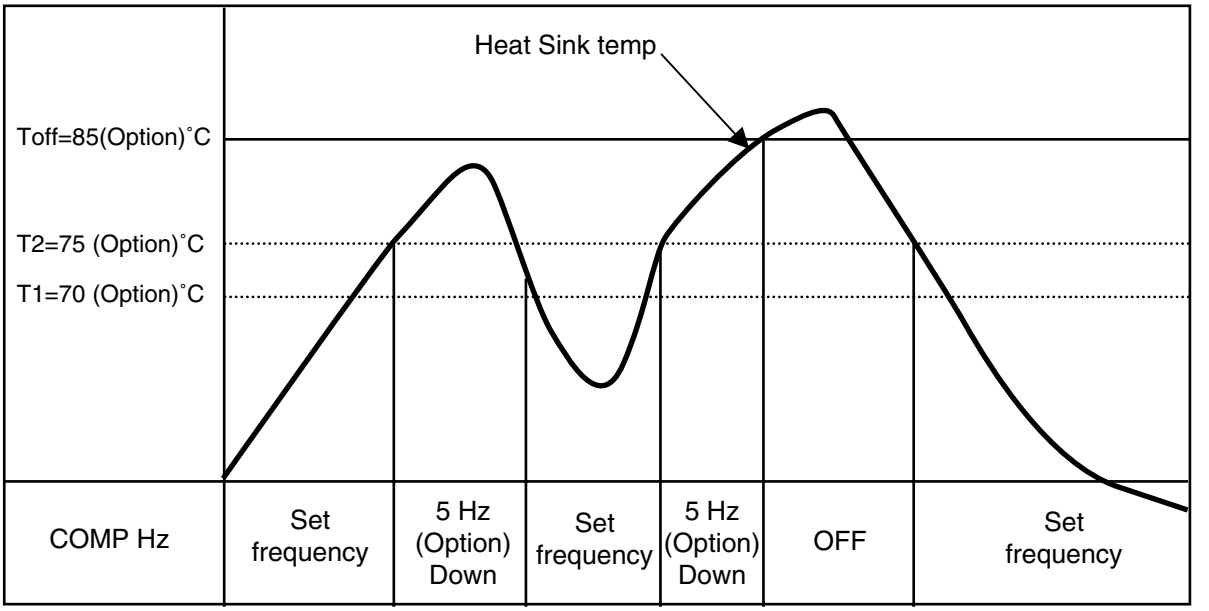
Short Check : if temperature ≥130˚C
Open Check : if temperature < - 30˚C
System will go in self diagnosis (error 65) is displayed and product stops.

11.3 Heat sink temperature control

a) Heat sink temperature < T2 : No limitation on compressor frequency

b) T2 ≤ heat sink temperature < Toff : Compressor frequency down by 5 Hz

c) Heat sink temperature ≥ Toff : Compressor will be off.
System will stop if this situation occurs 5 times in 1 hour and error code will be generated also self diagnosis will start.
If high temperature situation occurs 5 times in 1 hr system counts 1 error and after that 4 times if this situation occurs system stops and give error code.
If the temperature reached Toff condition system will count 5 times after that and system will stop with error code.



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4. Test Run

1. Check before Test Run.....40

2. Test Run Flow chart 41

3. Test Run Detail.....42

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1. Check before Test Run

1	Check to see whether there is any refrigerant leakage, and check whether the power or transmission cable is connected properly.
2	Check liquid pipe and gas pipe valves are fully opened. **NOTE**: Be sure to tighten caps.
3	Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less. **NOTE**: Never carry out mega ohm check over terminal control board. Otherwise the control board may break. Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground maydecrease to approx. 2.0 MΩ as a result of refrigerant accumulation in the internal compressor. If the insulation resistance is less than 2.0 MΩ, turn on the main power supply.

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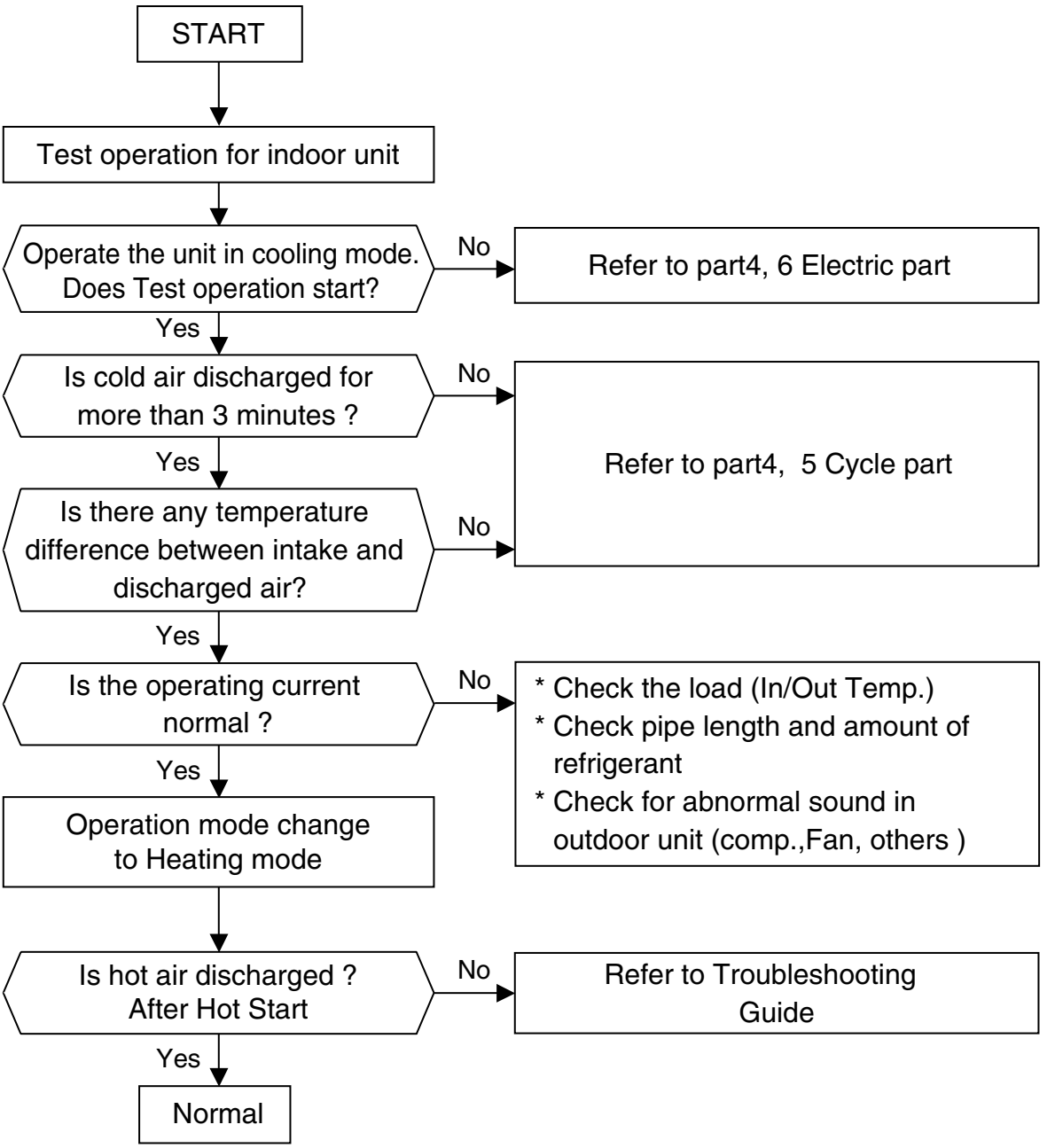
2. Test Run Flow chart


START
Test operation for indoor unit
Operate the unit in cooling mode. Does Test operation start?
No
Refer to part4, 6 Electric part
Yes
Is cold air discharged for more than 3 minutes ?
No
Refer to part4, 5 Cycle part
Yes
Is there any temperature difference between intake and discharged air?
No
Yes
Is the operating current normal ?
No
* Check the load (In/Out Temp.)
* Check pipe length and amount of refrigerant
* Check for abnormal sound in outdoor unit (comp.,Fan, others)
Yes
Operation mode change to Heating mode
Is hot air discharged ? After Hot Start
No
Refer to Troubleshooting Guide
Yes
Normal

- Each indoor unit should be tested.
- If the unit has accessory, it should be tested.

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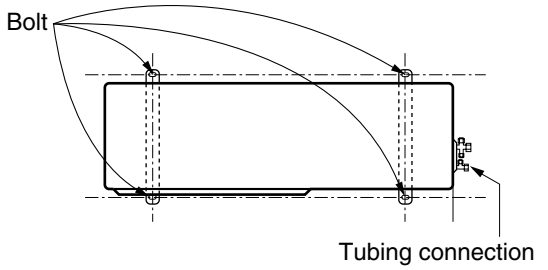
3. Test Run Detail

1. Check that all tubing and wiring have been properly connected.
2. Check that the gas and liquid side service valves are fully open.

Settlement of outdoor unit

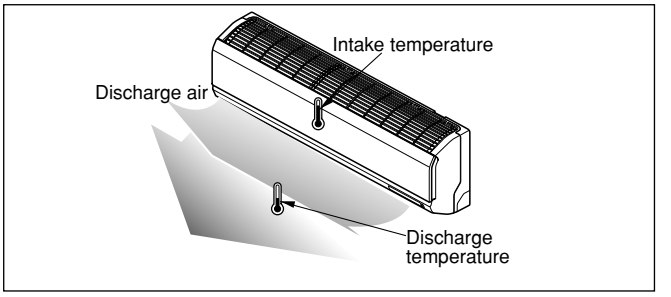
- Anchor the outdoor unit with a bolt and nut(ø10mm) tightly and horizontally on a concrete or rigid mount.
- When installing on the wall, roof or rooftop, anchor the mounting base securely with a nail or wire assuming the influence of wind and earthquake.
- In the case when the vibration of the unit is conveyed to the hose, secure the unit with an anti-vibration bushing.



Evaluation of the performance

Operate unit for 15~20 minutes, then check the system refrigerant charge:

1. Measure the pressure of the gas side service valve.
2. Measure the temperature of the intake and discharge air.
3. Ensure the difference between the intake temperature and the discharge is more than 8°C(46°F) (Cooling) or (Heating).



4. For reference; the gas side pressure of optimum condition is as below.(Cooling)

Refrigerant	Outside ambient TEMP.	The pressure of the gas side service valve.
R22	35°C (95°F)	4~5kg/cm²G(56.8~71.0 P.S.I.G.)
R410A	35°C (95°F)	8.5~9.5kg/cm²G(120~135 P.S.I.G.)

NOTE: If the actual pressure is higher than shown, the system is most likely over-charged, and charge should be removed.
If the actual pressure are lower than shown, the system is most likely undercharged, and charge should be added.

The air conditioner is now ready for use.

5. Check operating current.
6. Change operation mode and check.

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5. Trouble Shooting

1. Self-diagnosis Function.....44

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3. Evacuation 47

4. Gas Charging.....48

5. Cycle Part.....49

6. Electronic Parts 50

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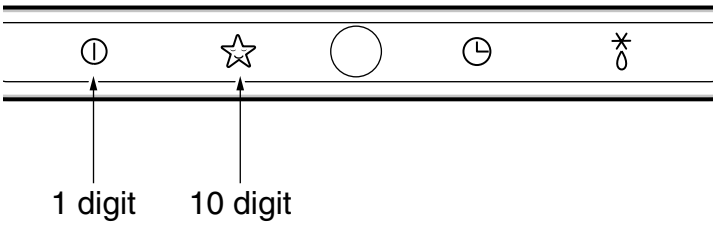
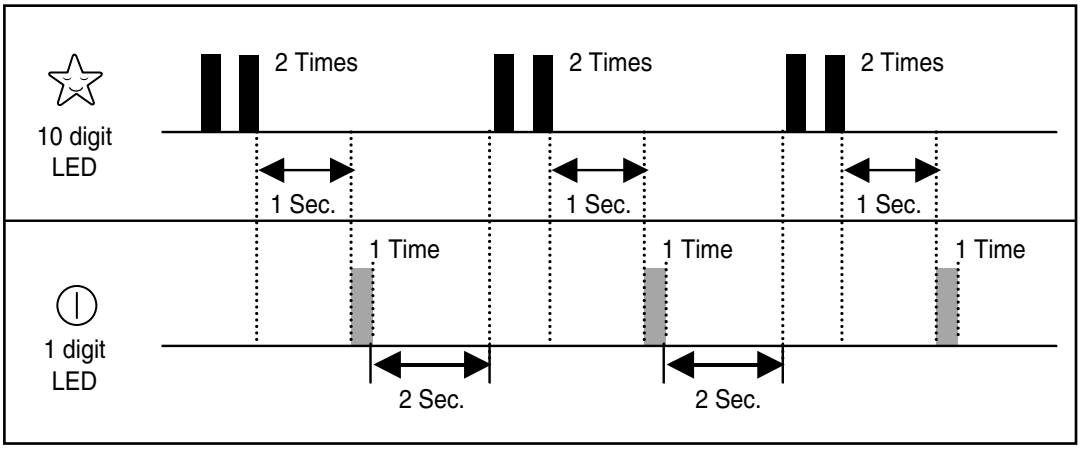
1. Self-diagnosis Function

1.1 Error Indicator (Indoor)

- The function is to self-diagnosis air conditioner and express the troubles if there is any trouble.
- Error mark is displayed on display window of indoor units and wired-remote controller, and LED of outdoor unit control board.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurs, if error is released, error LED is also released simultaneously.



Ex) Error 21 (DC Peak)



1.2 Indoor Error

Error code	Description	INV TPS	LED 1 (Red)	LED 2 (Green)	Indoor Status
00	No Error	●			ON
01	Indoor Room themistor error	●		1time ◑	OFF
02	Indoor in-piping sensor error	●		2times ◑	OFF
03	Remote controller error	●		3times ◑	OFF
04	Drain Pump error	●		4times ◑	OFF
05	Communcation error between in and out	●		5times ◑	OFF
06	Indoor Out-Piping sensor error	●		6times ◑	OFF
07	Differnt mode operation	●		7times ◑	OFF
09	Checksum error	●		9times ◑	OFF
10	BLDC motor fan lock (indoor)	●		10times ◑	OFF

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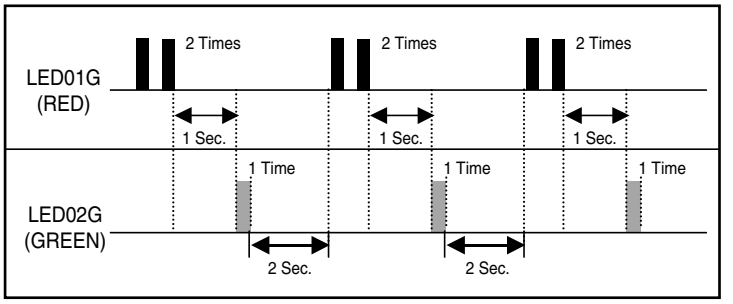
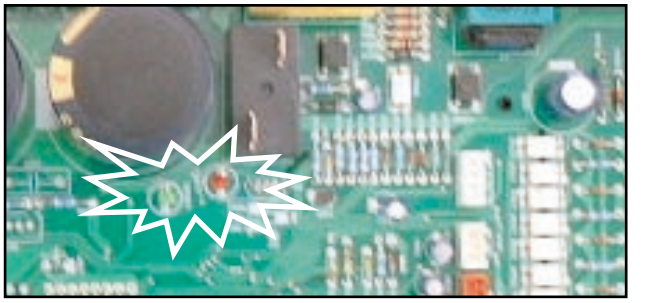
1.3 Error Indicator (Outdoor)

Outdoor Error
Ex) Error 21 (DC Peack)





Outdoor Error

Error Code	Description	INV TPS	LED 1 (Red)	LED 2 (Green)	Indoor Status
21	DC Peak (IPM Fault)	●	2times ◑	1time ◑	OFF
22	CT 2(Max CT)	●	2times ◑	2times ◑	OFF
23	DC Link Low Volt.	●	2times ◑	3times ◑	OFF
24	L_P/Heater Sink	●	2times ◑	4times ◑	OFF
25	Low voltage / Over voltage	●	2times ◑	5times ◑	OFF
26	DC Comp Position Error	●	2times ◑	6times ◑	OFF
27	PFC/PSC Fault Error	●	2times ◑	7times ◑	OFF
28	DC Link High Volt	●	2times ◑	8times ◑	OFF
29	COMP Over Current	-	2times ◑	9times ◑	OFF
32	D-Pipe High (INV)	●	3times ◑	2times ◑	OFF
33	D-Pipe High (Normal)	●	3times ◑	3times ◑	OFF
39	Communication Error	-	3times ◑	9times ◑	OFF
40	CT Sensor (Open/Short)	●	4times ◑	O	OFF
41	INV. D-PipeTh Error(Open/Short)	●	4times ◑	1time ◑	OFF
44	Outdoor air Th Error(Open/Short)	●	4times ◑	4times ◑	OFF
45	Cond. Pipe Th Error(Open/Short)	●	4times ◑	5times ◑	OFF
46	Suction Pipe Error(Open/Short)	●	4times ◑	6times ◑	OFF
47	Const D-pipe Th Error(Open/Short)	●	4times ◑	7times ◑	OFF
51	Capacity over	●	5times ◑	1time ◑	OFF
52	Signal Error (DSP Board ↔ Main Board)	●	5times ◑	2time ◑	OFF
53	Signal error (Indoor ↔ Outdoor)	●	5times ◑	3times ◑	OFF
60	EEPROM Check Sum Error	●	6times ◑	O	OFF
61	Cond. Pipe High	●	6times ◑	1time ◑	OFF
62	Heatsink High	●	6times ◑	2times ◑	OFF
63	Cond. Pipe Low	●	6times ◑	3times ◑	OFF
65	Heatsoml Th error (Open/Short)	●	6times ◑	5times ◑	OFF
67	BLDC motor fan lock (outdoor)	●	6times ◑	7times ◑	OFF
73	PFC Fault Error (S/W)	-	7times ◑	3times ◑	OFF

CAUTION

Precaution in Service or Check

Even after stopping the operation of product, it takes some time to discharge the remaining electricity of the electrolytic capacitor that was charged early.
Before conducting a checking or repairing job, pull out the plug out of the outlet and make sure that the lamp on the control board outdoor unit is off.

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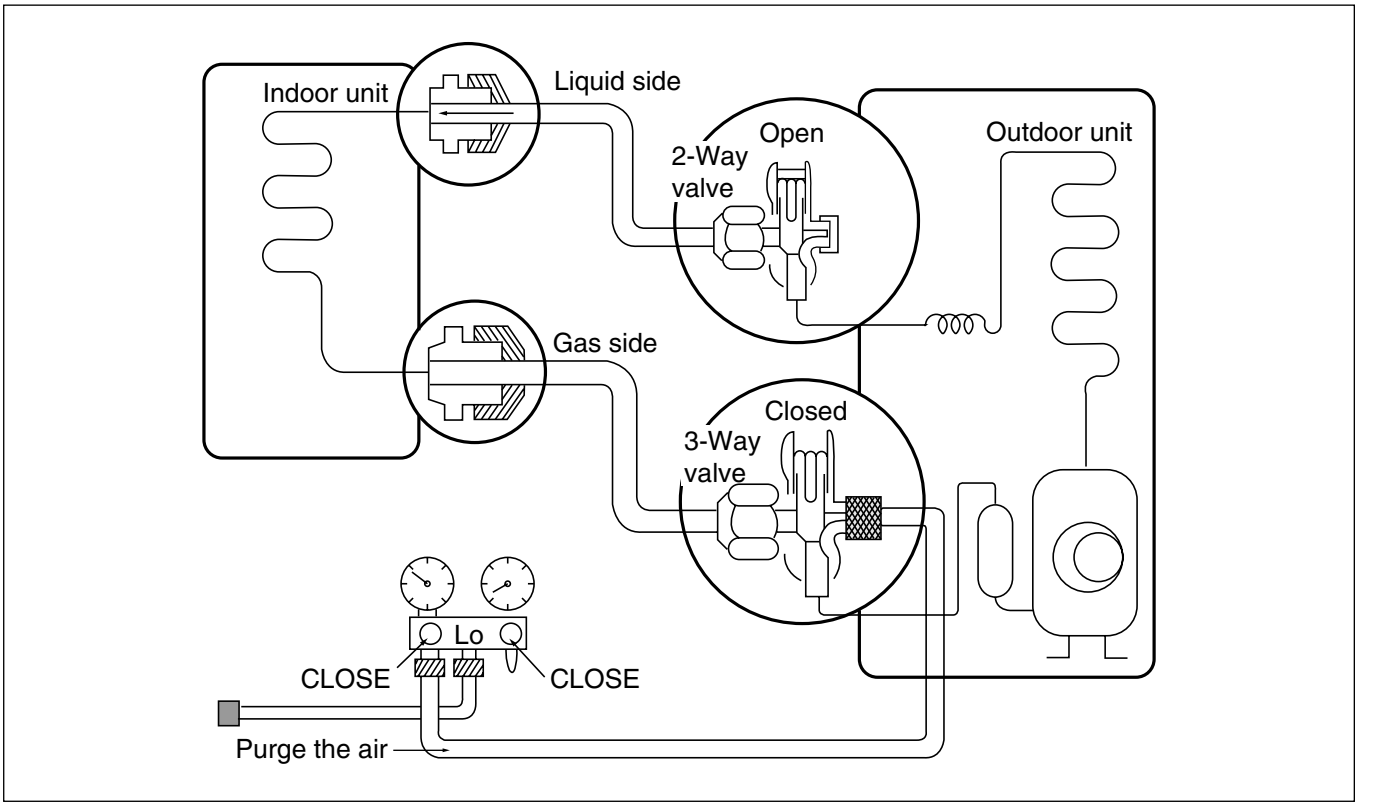
2. Pumping Down



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the open position.
- Remove the valve stem caps and confirm that the valve stems are in the raised position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
- Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.
- Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 1kg/cm²g.

(7) Immediately set the 3-way valve to the closed position.
- Do this quickly so that the gauge ends up indicating 3 to 5kg/cm²g.

(8) Disconnect the charge set, and mount the 2-way and 3-way valve's stem nuts and the service port nut.
- Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

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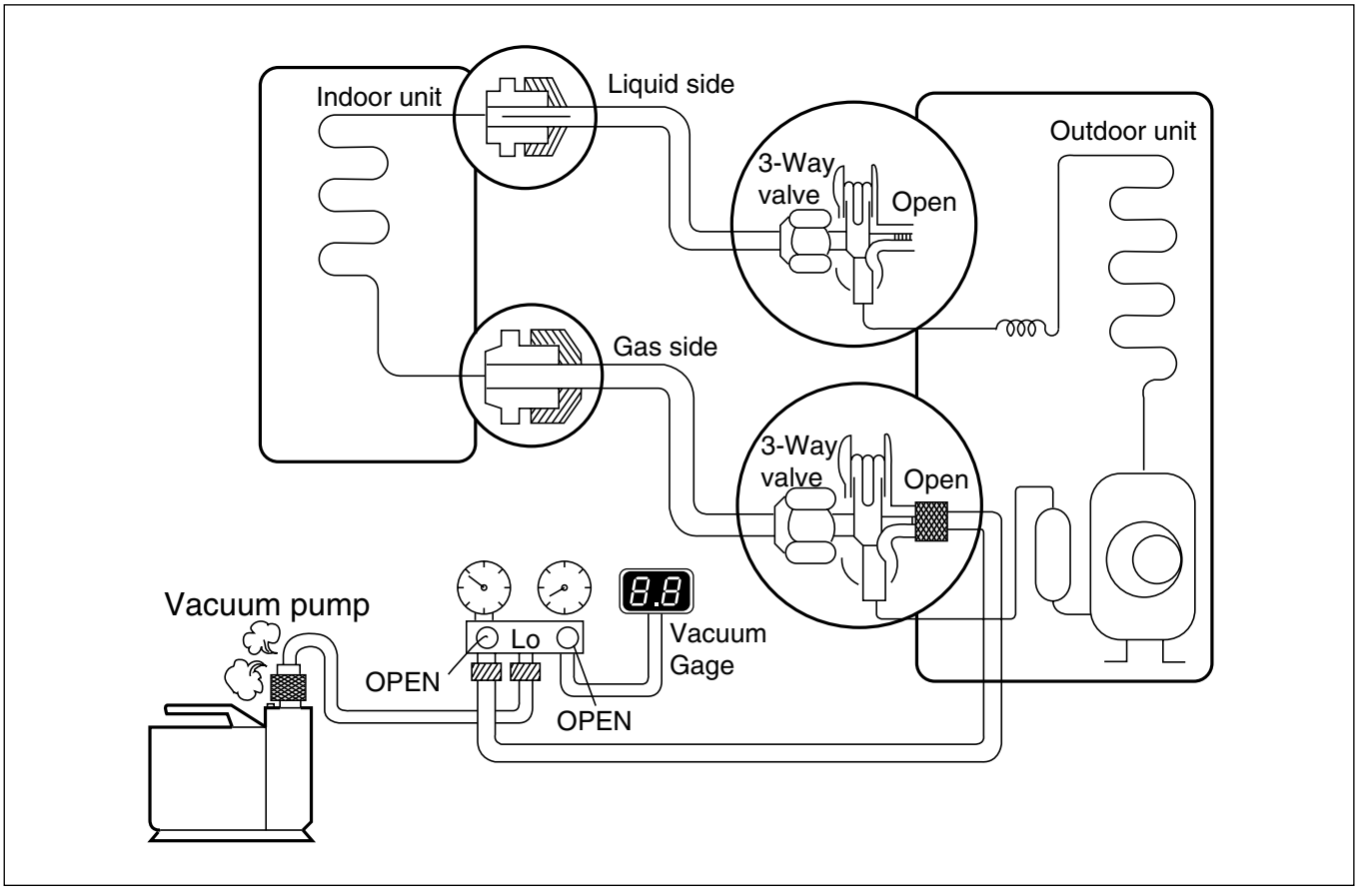
3. Evacuation (All amount of refrigerant leaked)



• Procedure

(1) Connect the vacuum pump to the center hose of charge set center hose

(2) Evacuation for approximately one hour.
– Confirm that the gauge needle has moved toward 0.8Torr.

(3) Close the valve (Lo side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

(4) Disconnect the charge hose from the vacuum pump.
– Vacuum pump oil.
If the vacuum pump oil becomes dirty or depleted, replenish as needed.

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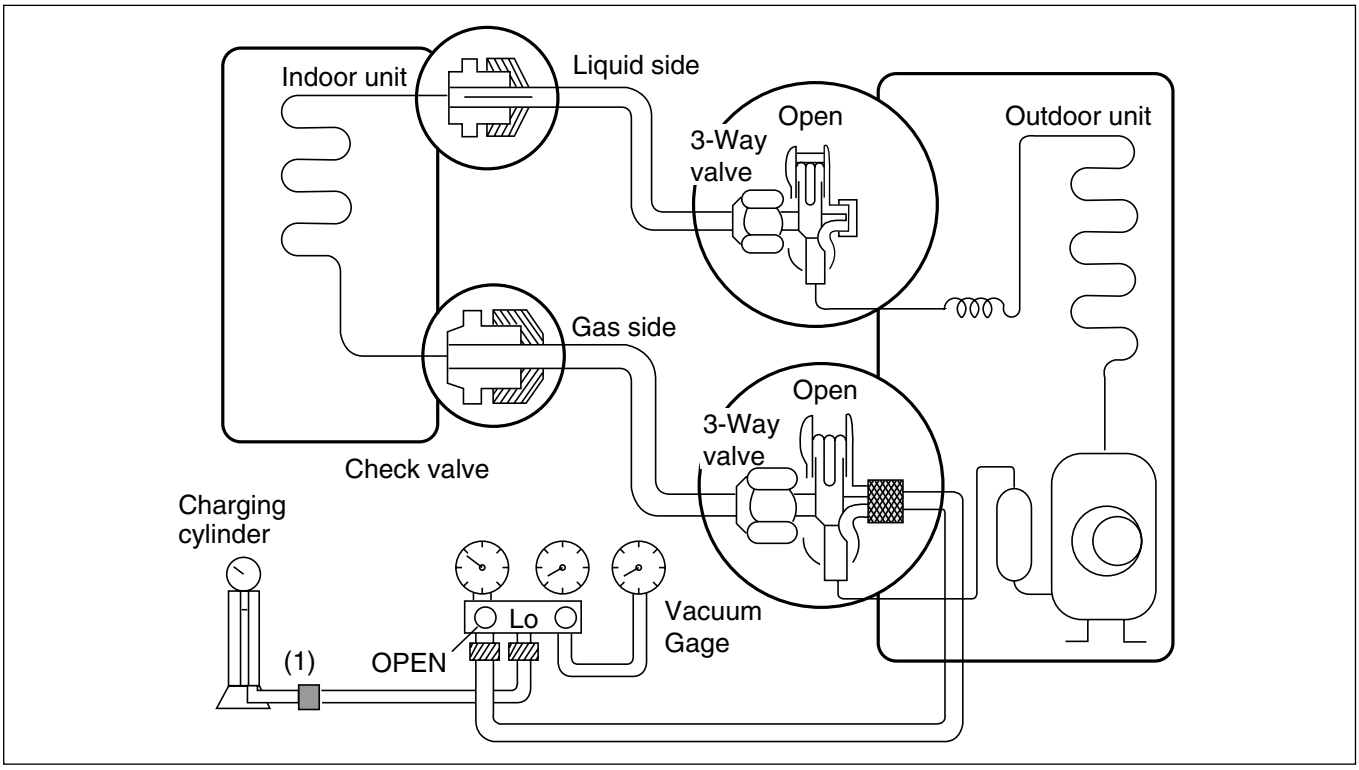
4. Gas Charging (After Evacuation)



• Procedure

(1) Connect the charge hose to the charging cylinder.
- Connect the charge hose which you dis-connected from the vacuum pump to the valve at the bottom of the cylinder.
- If you are using a gas cylinder, also use a scale and reverse the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.
- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant). The procedure is the same if using a gas cylinder.

(3) Open the valve (Lo side on the charge set and charge the system with liquid refrigerant.
- If the system can not be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure (pumping down-pin).

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with larger amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.
- Stopping partway will allow the gas to be discharged.
- If the system has been charged with liquid refrigerant while operating the air conditioner turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem nuts and the service port nut.
- Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

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5. Cycle Part

Trouble analysis

1. Check temperature difference between intake and discharge air, and check for the operating current too.

Case	Symptom	Supposed Caused
Case 1	Temp. difference : approx. 0°C Current : less than 80% of rated current	All amount of refrigerant leaked out. Check refrigeration cycle.
Case 2	Temp. difference : approx. 8°C Current : less than 80% of rated current	Refrigerant leakage Clog of refrigeration cycle Defective Compressor.
Case 3	Temp. difference : less than 8°C Current : over the rated current	Excessive amount of refrigerant
Case 4	Temp. difference : over 8°C	Normal

NOTICE

Temperature difference between intake and discharge air depends on room air humidity. When the room air humidity is relativery higher, temperature difference is smaller. When the room air humidity is relatively lower temperature difference is larger.

2. Check temperature and pressure of refrigeration cycle in cooling mode.

Suction pressure (Compared with the normal value)	Temperature of Discharge Air (Compared with the normal valve)	Cause of Trouble	Description
Higher	High	Defective compressor Defective 4-way reverse valve	Current is low.
	Normal	Excessive amount of refrigerant	High pressure does not quickly rise at the beginning of operation.
Lower	Higher	Insufficient amount of refrigerant (Leakage) Clogging	Current is low.

NOTICE

1. The suction pressure is usually 8.5~9.5kg/cm2G(Cooling) at normal condition.(R410A)

2. The temperature can be measured by attaching the thermometer to the low pressure tubing and wrap it with putty.

	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
	Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

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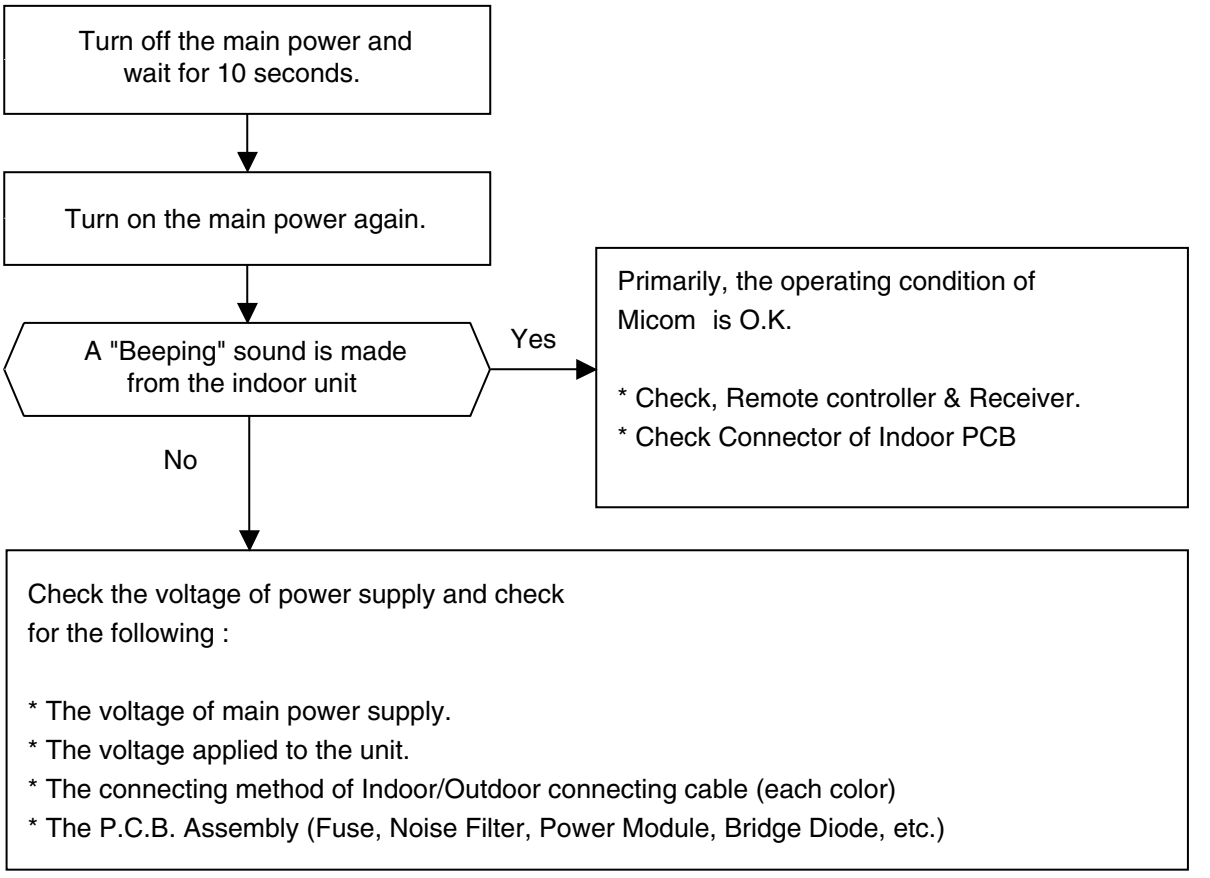
6. Electronic Parts

6.1 The Product doesn' t operate at all


Turn off the main power and wait for 10 seconds.
Turn on the main power again.
A "Beeping" sound is made from the indoor unit
Yes
Primarily, the operating condition of Micom is O.K.
* Check, Remote controller & Receiver.
* Check Connector of Indoor PCB
No
Check the voltage of power supply and check for the following :
* The voltage of main power supply.
* The voltage applied to the unit.
* The connecting method of Indoor/Outdoor connecting cable (each color)
* The P.C.B. Assembly (Fuse, Noise Filter, Power Module, Bridge Diode, etc.)

The operation check of the Indoor P.C.B. Ass'y		
Procedure	**Specification**	**Remedy**
1) The input voltage of power module.	1) AC230V ± 30V : Check the rated voltage	1) Check the power outlet.
2) The output voltage of power module.	2) 12V ± 3V	2) Replace P.C.B Ass'y

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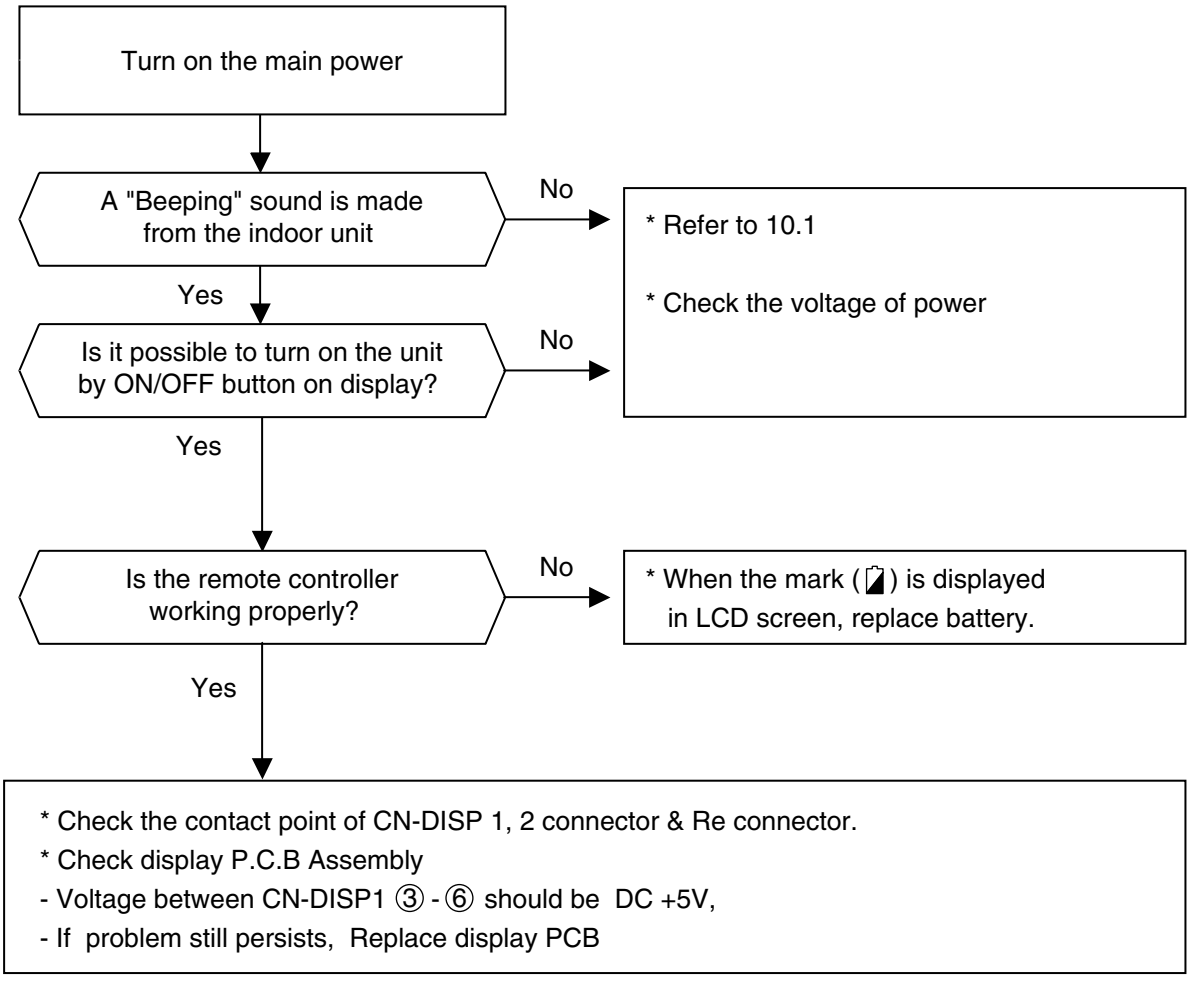
6.2 The Product doesn't operate with the remote controller


Turn on the main power
A "Beeping" sound is made from the indoor unit
No
* Refer to 10.1
* Check the voltage of power
Yes
Is it possible to turn on the unit by ON/OFF button on display?
No
Yes
Is the remote controller working properly?
No
* When the mark ( ) is displayed in LCD screen, replace battery.
Yes
* Check the contact point of CN-DISP 1, 2 connector & Re connector.
* Check display P.C.B Assembly
- Voltage between CN-DISP1 ③ - ⑥ should be DC +5V,
- If problem still persists, Replace display PCB

	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
	Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

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6.3 The Compressor/Outdoor Fan are don't operate

Turn on the main power.

↓

Operate Cooling Mode by setting the disired temperature of the remote controller is less than one of the Indoor temperature by 1°C at least.

↓

When in air circulation mode, compressor/outdoor fan is stopped.

↓

Check the sensor for Indoor temperature is attatched as close as to be effected by the themperature of Heat Exchange (EVA.)

↓

When the sensor circuit for Indoor temperature and connector are in bad connection or are not engaged, Compressor/Outdoor fan is stopped.

- Check the related circuit of R02H(12.1K), R01H(1K), R04H(6.2K), R03H(1K), C01H(102), C02H(102), Micom(pin No. ⑪, ⑫).
- Check the Indoor temperature sensor is disconnected or not (about 10K at 25°C).

↓

Check the Relay(RY-PWR, RY-START) for driving Compressor.

- Check the voltage between brown and blue cable of terminal to connect the Outdoor (About AC220V / 240V).
- Check the related circuit of relay in Outdoor PCB Ass'y.

Check Point	Comp. ON	Comp. OFF
Between Micom(No. 19) and GND	DC 5V	DC 0V
Between IC01M(No. 10) and GND	DC 1V↓	DC 12V

↓

Turn off main power.

↓

Check the electrical wiring diagram of Outdoor side.
Check the open or short of connecting wires between Indoor and Outdoor.

	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
	Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

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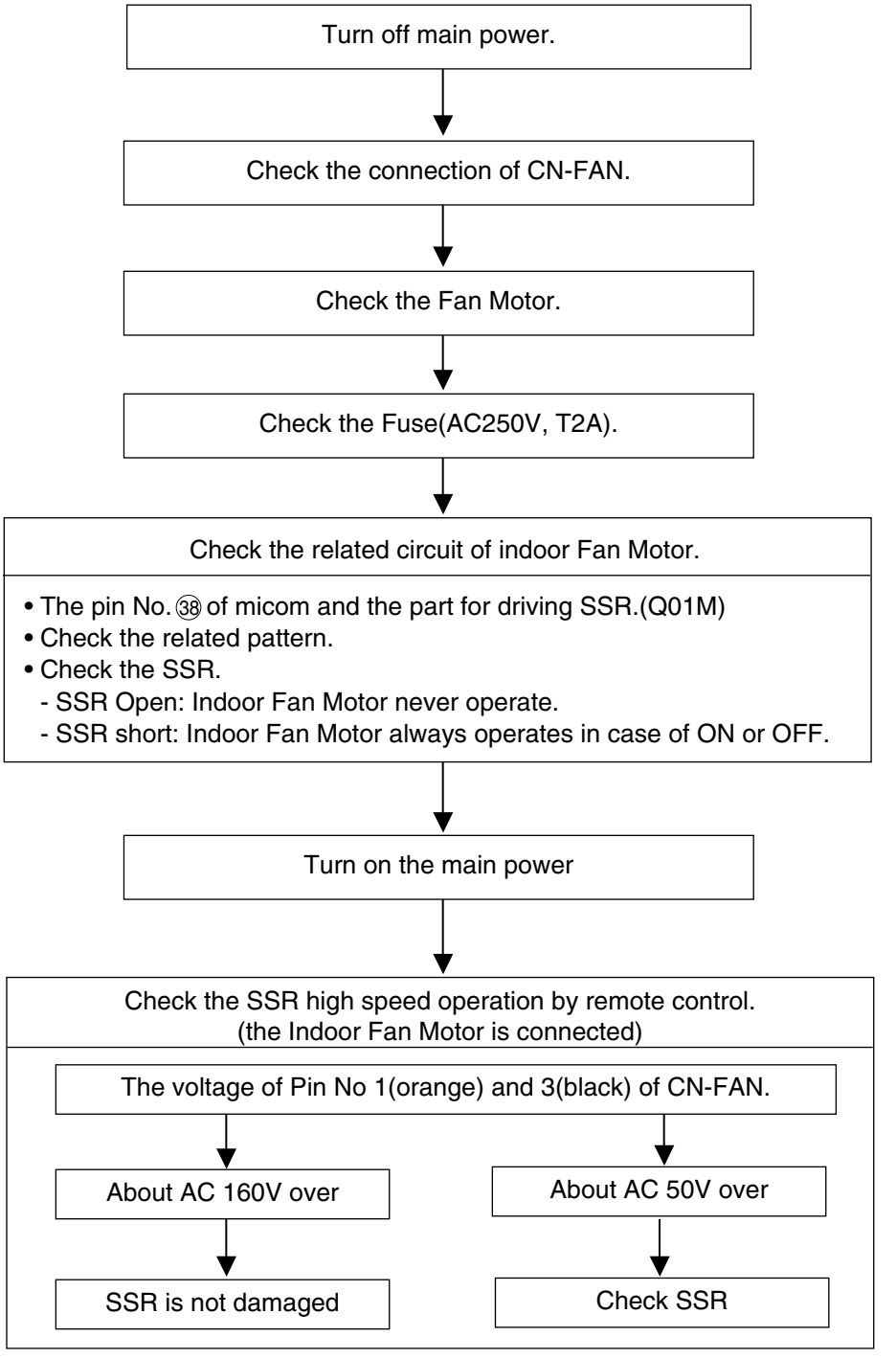
6.4 When indoor Fan does not operate.


Turn off main power.
Check the connection of CN-FAN.
Check the Fan Motor.
Check the Fuse(AC250V, T2A).
Check the related circuit of indoor Fan Motor.
• The pin No. ㊳ of micom and the part for driving SSR.(Q01M)
• Check the related pattern.
• Check the SSR.
- SSR Open: Indoor Fan Motor never operate.
- SSR short: Indoor Fan Motor always operates in case of ON or OFF.
Turn on the main power
Check the SSR high speed operation by remote control.
(the Indoor Fan Motor is connected)
The voltage of Pin No 1(orange) and 3(black) of CN-FAN.
About AC 160V over
About AC 50V over
SSR is not damaged
Check SSR

⚠	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
⚠	Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

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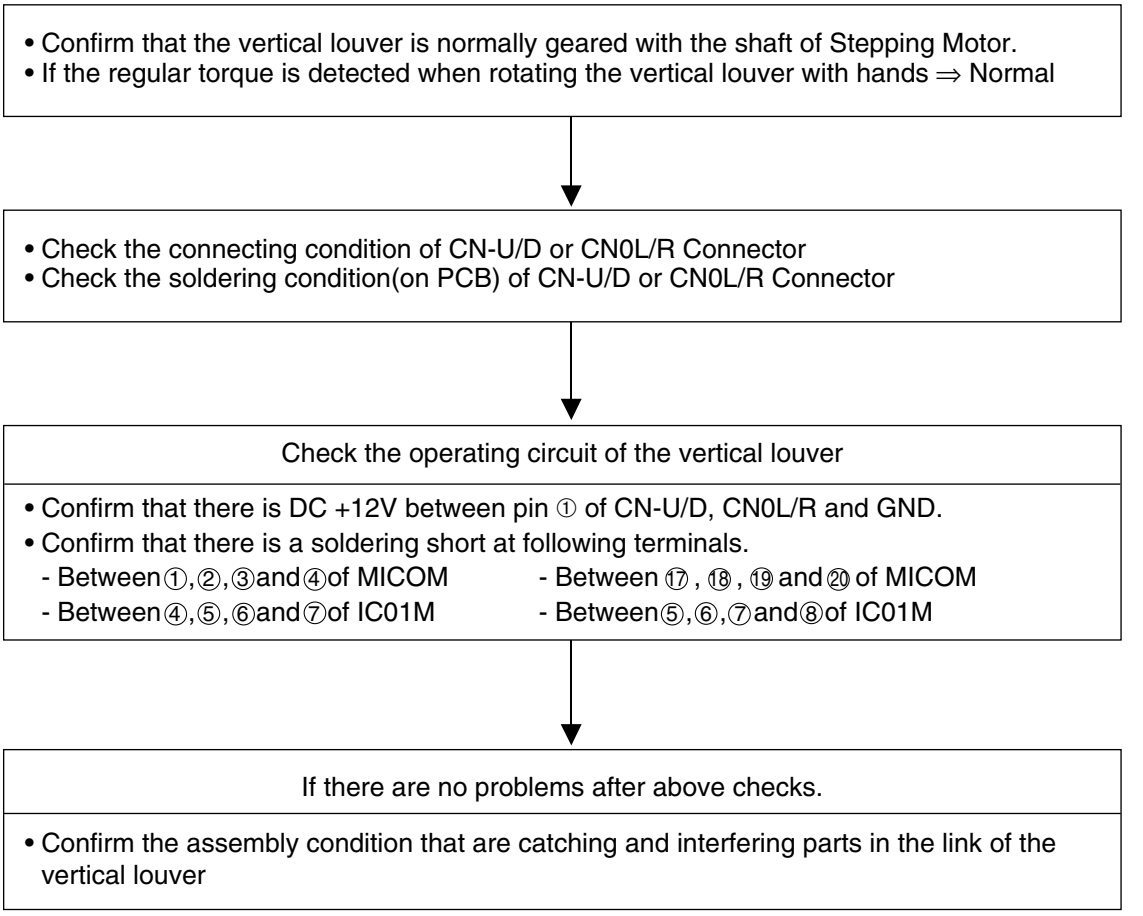
6.5 When the louver does not operate.


• Confirm that the vertical louver is normally geared with the shaft of Stepping Motor.
• If the regular torque is detected when rotating the vertical louver with hands ⇒ Normal
• Check the connecting condition of CN-U/D or CN0L/R Connector
• Check the soldering condition(on PCB) of CN-U/D or CN0L/R Connector
Check the operating circuit of the vertical louver
• Confirm that there is DC +12V between pin ① of CN-U/D, CN0L/R and GND.
• Confirm that there is a soldering short at following terminals.
- Between①,②,③and④of MICOM
- Between⑰, ⑱, ⑲and⑳of MICOM
- Between④,⑤,⑥and⑦of IC01M
- Between⑤,⑥,⑦and⑧of IC01M
If there are no problems after above checks.
• Confirm the assembly condition that are catching and interfering parts in the link of the vertical louver

	Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.
	Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

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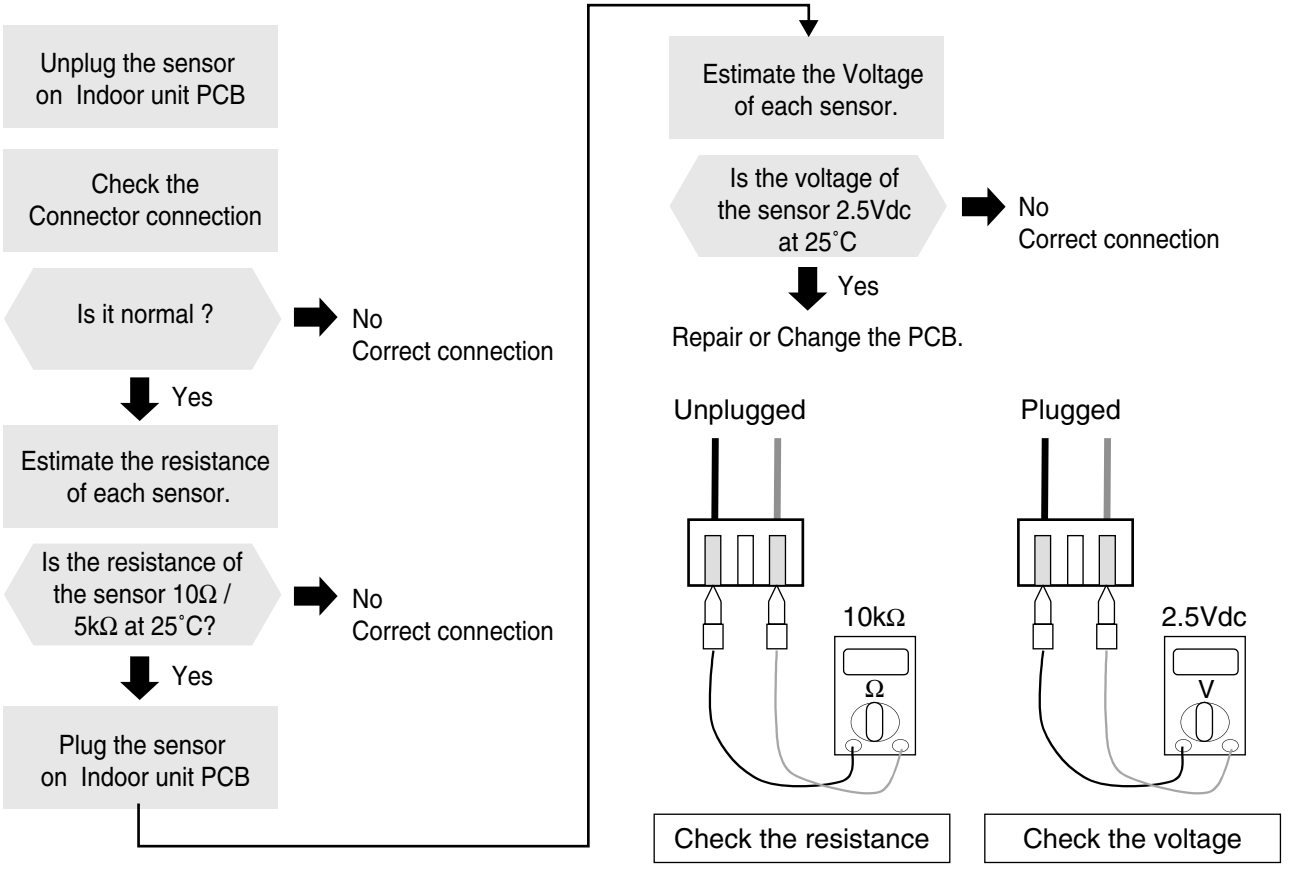
6.6 Check code Trouble shooting CH01, CH02, CH06

Display code	Title	Cause of error	Check point & Normal condition
01	Indoor air sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	Normal resistor : 10KΩ/ at 25˚C (Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
02	Indoor inlet pipe sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
06	Indoor outlet pipe sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.

Check Flow Chart



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6.7 Check code Trouble shooting CH03

Display code	Title	Cause of error	Check point & Normal condition
03	Communication Error (Wired remote controller)	• Connector connection error • Faulty PCB / Remote controller • Connection wire break	• Connection of wire • Main PCB Volt. DC12V • Noise interference

Check Flow Chart

Check the wire connection(Open / Short / Miswirring)

Is it normal ?

→ No
Correct connection
Or change connection wire

↓ Yes

Is the soldering state of connector is normal?

→ No
Re-soldering component
Or change the PCB

↓ Yes

Check the volt. of main PCB power source. (DC 12V,DC 5V)

Is it normal ?

→ No
Correct connection
Or change the PCB

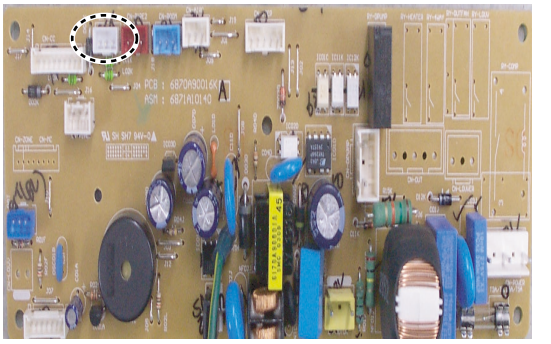
↓ Yes

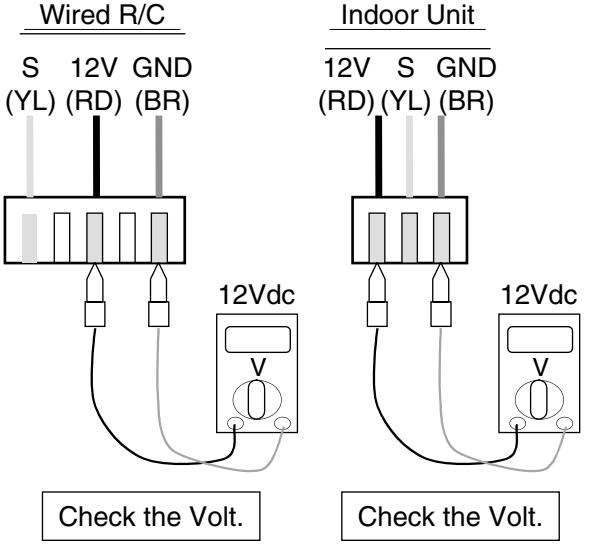
Check the installation of wired remote controller. (Noise interference)

Is it normal ?

→ No
Adjust the state of installation

CN-REMO





Check the Volt.

Check the Volt.

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6.8 Check code Trouble shooting CH04

Display code	Title	Cause of error	Check point & Normal condition
04	Drain pump / Float switch	• Float switch open. (Normal : short) • Water over flow	• The connection of wire (Drain pump/ Float switch) • Drain pump power input. (220V) • Drain tube installation. • Indoor unit installation. (Inclination)

Check Flow Chart

Check the level of water (Float moves top position)

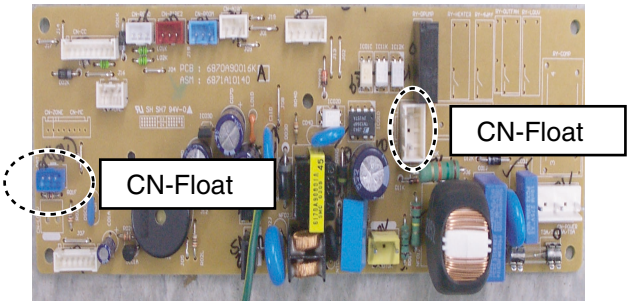
Is it normal ?
- No → Check Drain Pump
- Yes ↓

Is the float switch clean ?
- No → Clean float switch
- Yes ↓

Check the wire connection (Open, Soldered poorly)

Is it normal ?
- No → Correct connection Or re-soldering PCB
- Yes ↓

Is the resistance of f loat switch normal (short) ?
- No → Change the float switch



※ Drain pump check

Check the wire connection (Open, Soldered poorly)

Is it normal ?
- No → Correct connection Or re-soldering PCB
- Yes ↓

Is the resistance of Drain Pump? Normal (about 400Ω) ?
- No → Change the Drain Pump
- Yes ↓

Is the drain pump clean ?
- No → Clean drain pump
- Yes ↓

Check drain tube installation

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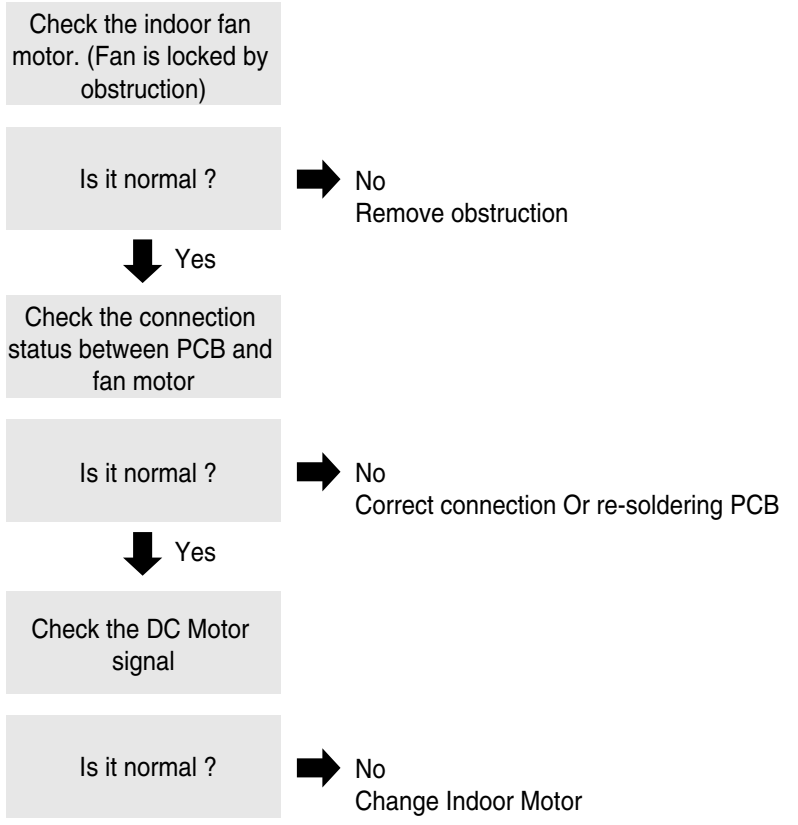
6.9 Check code Trouble shooting CH09, CH10

Display code	Title	Cause of error	Check point & Normal condition
09	EEPROM Check sum (Indoor)	• Check sum error	• Check the poor soldering. • Change PCB
10	BLDC motor fan lock (Indoor)	• Fan motor break down • Fan motor & PCB poor contact • Obstruction to the fan	• Check the indoor fan motor. • Check the connection status between • PCB and fan motor.

Check Flow Chart



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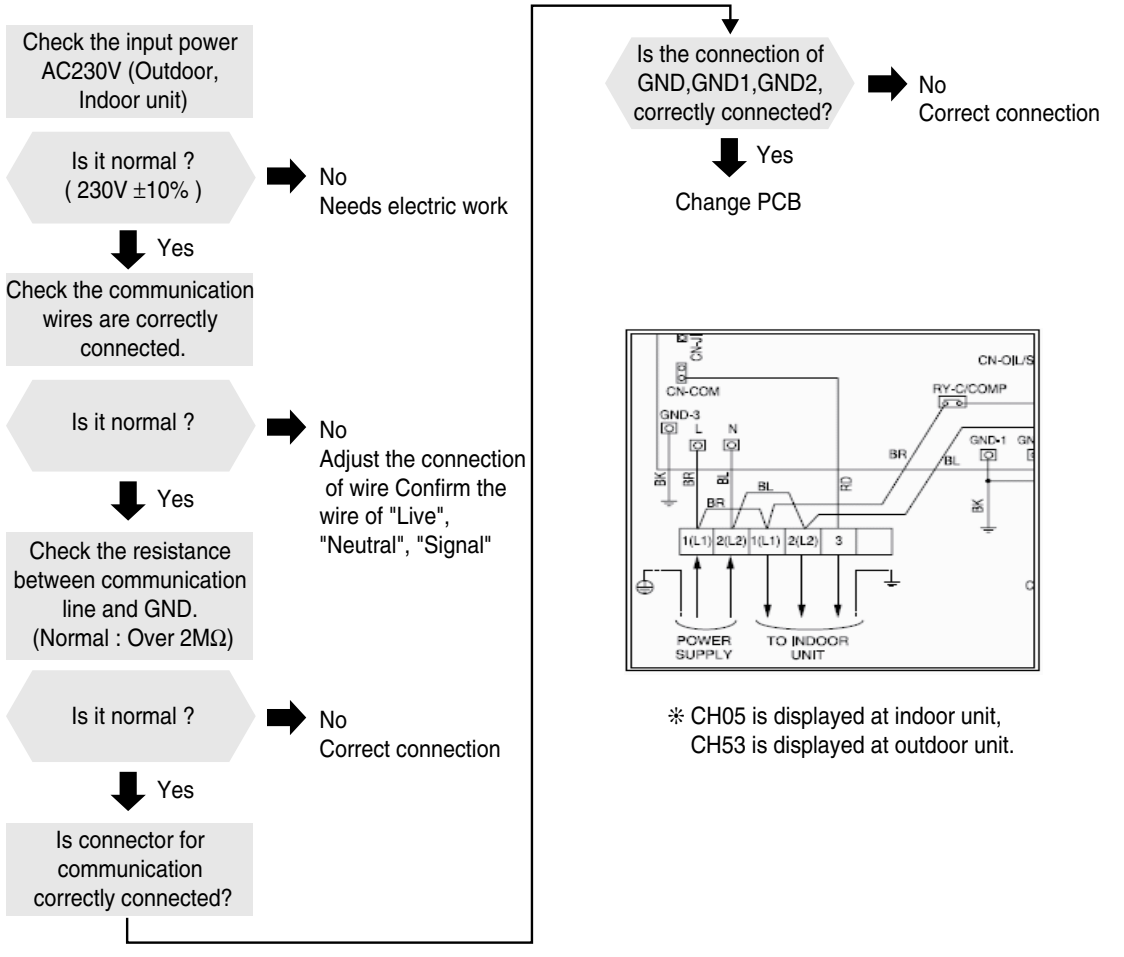
6.10 Check code Trouble shooting CH05, CH53

Display code	Title	Cause of error	Check point & Normal condition
05 / 53	Communication (Indoor↔Outdoor)	• The connector for transmission is disconnected. • The connecting wires are misconnected. • The communication line is break • Outdoor PCB is abnormal. • Indoor PCB is abnormal. • Synchro # of IDU is abnormal.	• Check power input AC 230V. (Outdoor, Indoor) • Check connector for transmission • Check wires are misconnecting. • Check transmission circuit of outdoor PCB • Check transmission circuit of indoor PCB • Check # of IDU setting DIP SW

Check Flow Chart


Check the input power AC230V (Outdoor, Indoor unit)
Is it normal ? (230V ±10%)
No
Needs electric work
Yes
Check the communication wires are correctly connected.
Is it normal ?
No
Adjust the connection of wire Confirm the wire of "Live", "Neutral", "Signal"
Yes
Check the resistance between communication line and GND. (Normal : Over 2MΩ)
Is it normal ?
No
Correct connection
Yes
Is connector for communication correctly connected?
Is the connection of GND,GND1,GND2, correctly connected?
No
Correct connection
Yes
Change PCB

※ CH05 is displayed at indoor unit,
CH53 is displayed at outdoor unit.

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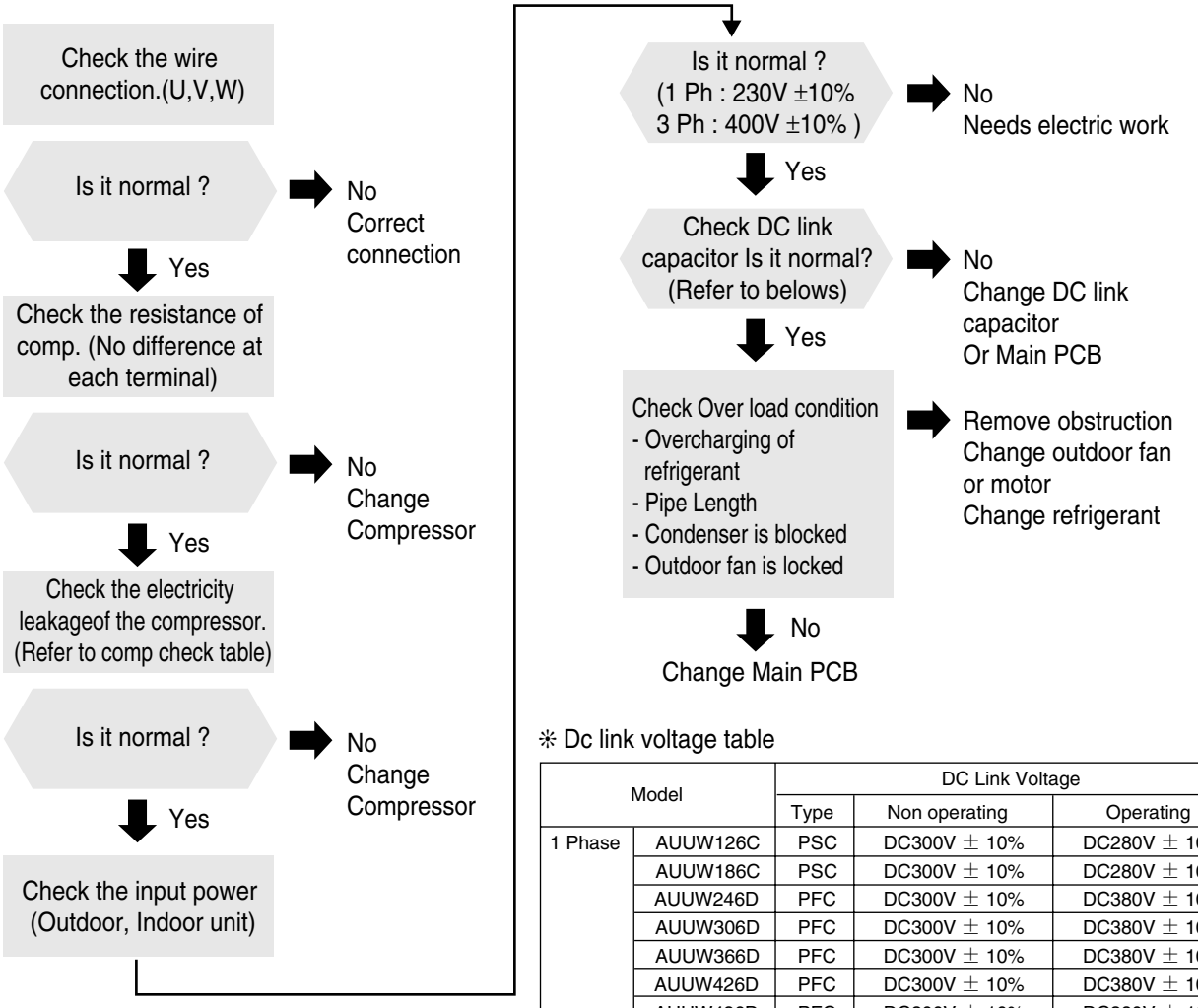
6.11 Check code Trouble shooting CH21

Display code	Title	Cause of error	Check point & Normal condition
21	DC Peak	• Instant over current • Over Rated current • Poor insulation of IPM	• An instant over current in the U,V,W phase - Comp lock - The abnormal connection of U,V,W • Over load condition - Overcharging of refrigerant - Pipe length. • Poor insulation of compressor

Check Flow Chart



※ Dc link voltage table

Model		DC Link Voltage		
		Type	Non operating	Operating
1 Phase	AUUW126C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW186C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW246D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW306D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW366D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW426D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW486D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW606D	PFC	DC300V ± 10%	DC380V ± 10%
3 Phase	AUUW368D	PSC	DC540V ± 10%	DC500V ± 10%
	AUUW428D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW488D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW608D	PFC	DC540V ± 10%	DC680V ± 10%

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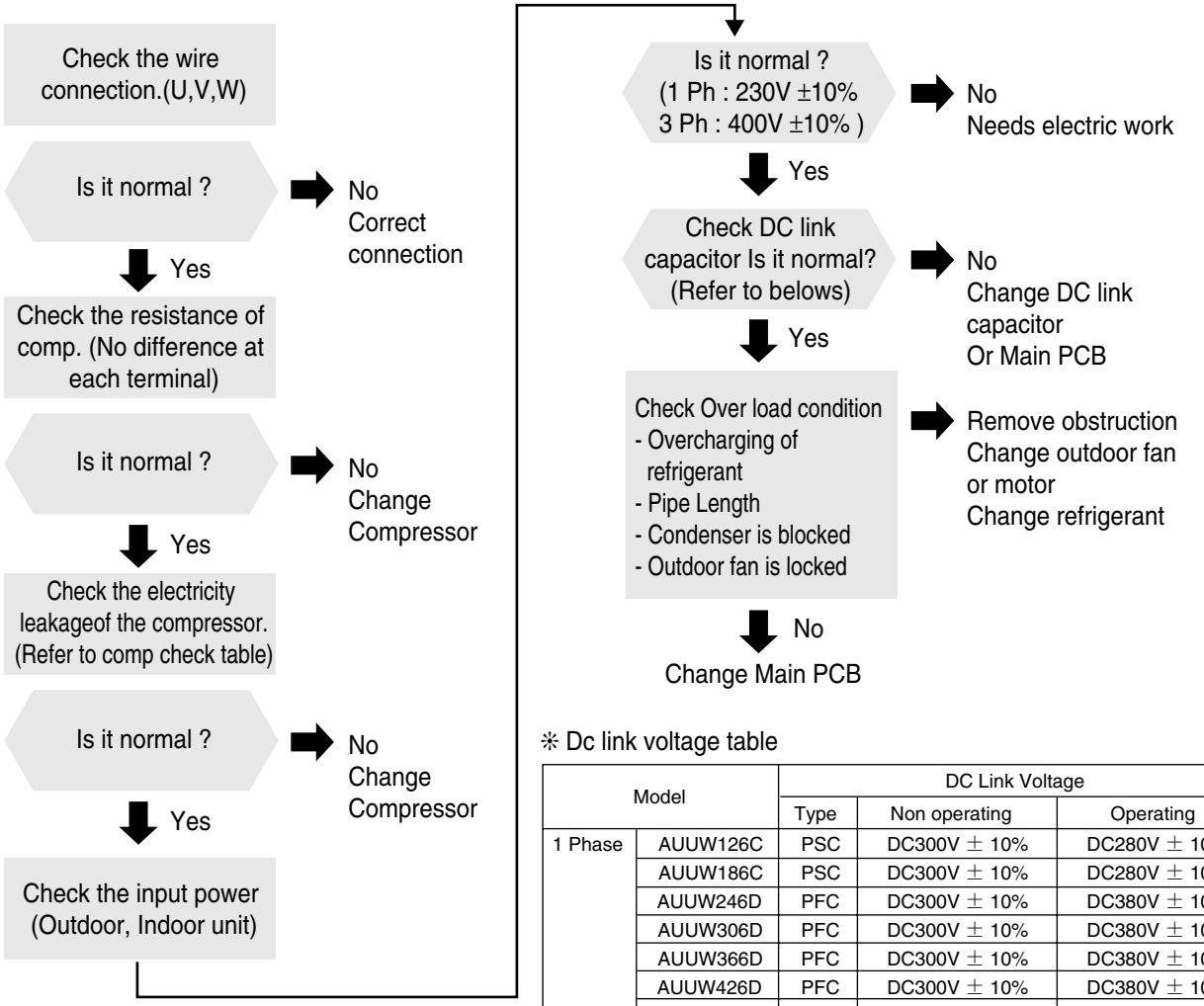
6.12 Check code Trouble shooting CH22

Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	• Over current	• Malfunction of compressor • Blocking of pipe • Low voltage input • Refrigerant, pipe length, blocked, …

Check Flow Chart



※ Dc link voltage table

Model		DC Link Voltage		
		Type	Non operating	Operating
1 Phase	AUUW126C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW186C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW246D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW306D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW366D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW426D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW486D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW606D	PFC	DC300V ± 10%	DC380V ± 10%
3 Phase	AUUW368D	PSC	DC540V ± 10%	DC500V ± 10%
	AUUW428D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW488D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW608D	PFC	DC540V ± 10%	DC680V ± 10%

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6.13 Check code Trouble shooting CH23, CH28

Display code	Title	Cause of error	Check point & Normal condition
23	DC Link Low voltage.	• 1ph : DC link volt. is 140Vdc ↓ • 3ph : DC link volt. is 250Vdc ↓	• Check the power source. • Check the components.
28	DC Link High voltage	• 1ph : DC link volt. is 140Vdc ↑ • 3ph : DC link volt. is 250Vdc ↑	• Check the power source. • Check the components.

Check Flow Chart

Check the wire connection.(U,V,W)

↓

Is it normal ? → No → Correct connection

↓ Yes

Is it normal ? → No → Change Compressor

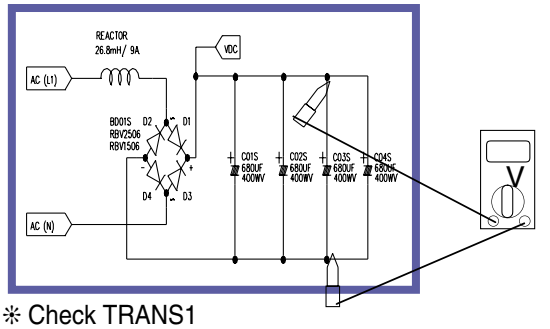
↓ Yes

Is it normal ? → No → Change Compressor

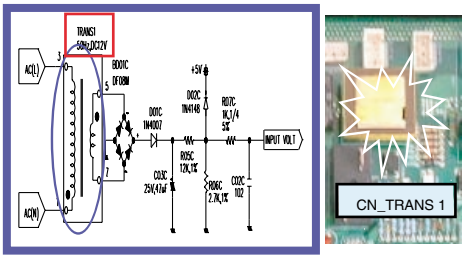
↓ Yes

Check the input power

※ Check DC link voltage



※ Check TRANS1



※ Dc link voltage table

Model		DC Link Voltage		
		Type	Non operating	Operating
1 Phase	AUUW126C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW186C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW246D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW306D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW366D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW426D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW486D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW606D	PFC	DC300V ± 10%	DC380V ± 10%
3 Phase	AUUW368D	PSC	DC540V ± 10%	DC500V ± 10%
	AUUW428D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW488D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW608D	PFC	DC540V ± 10%	DC680V ± 10%

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6.14 Check code Trouble shooting CH24

Display code	Title	Cause of error	Check point & Normal condition
24	Press S/W Open	• Low / High press S/W open.	• Check the connection of “CN_PRESS” • Check the SVC V/V open. • Check the leakage of refrigerant.

Check Flow Chart

Is the wire connection normal ?
→ No: Correct connection
↓ Yes

Is the soldering state of connector is normal?
→ No: Re-soldering component
↓ Yes

Is the SVC Valve opened ?
→ No: Open SVC Valve
↓ Yes

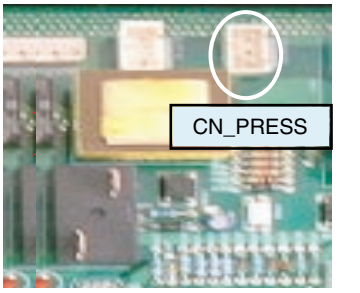
Check the leakage of refrigerant.
Check Pressure of suction pipe
Check Pressure of discharge pipe

Is it normal ?
→ No: Re-vaccuming system & Re-charging
↓ Yes

Change main PCB

※ Pressure switch table

Switch	Low pressure switch	High pressure switch
Spec	0.03 Mpa	4.3 Mpa
Model	AUUW126C AUUW186C	AUUW246D AUUW306D AUUW366D AUUW426D AUUW486D AUUW606D AUUW368D AUUW428D AUUW488D AUUW608D



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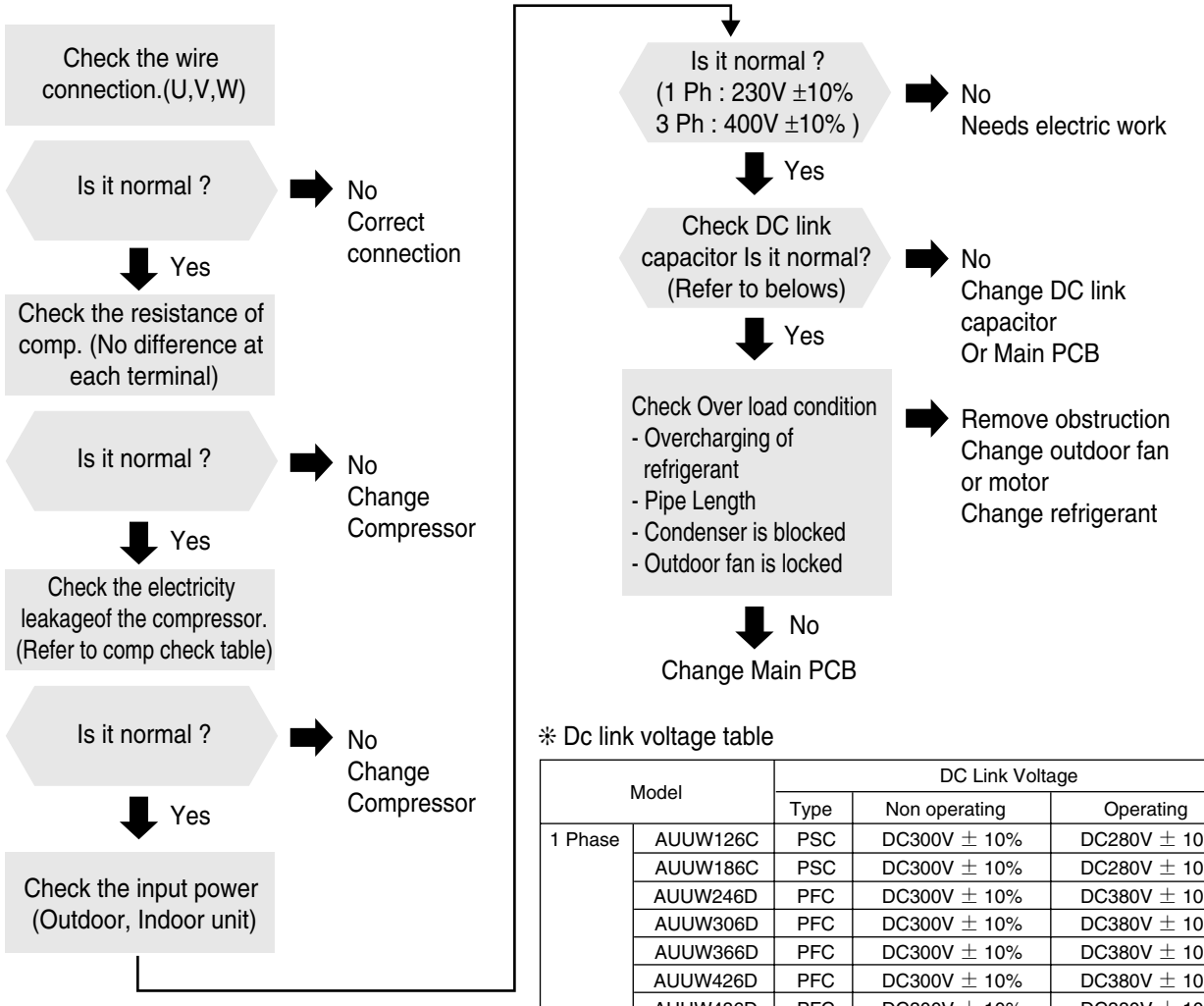
6.15 Check code Trouble shooting CH26, CH27

Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	• Compressor position detect error	• Check the connection of comp wire “U,V,W” • Malfunction of compressor • Check the component of “IPM”, detection parts.
27	PSC Fault PFC Fault	• Over current at “IGBT”/PFC module	• Check the component of “IGBT” /PFC module. • Check the components.

Check Flow Chart



※ Dc link voltage table

Model		DC Link Voltage		
		Type	Non operating	Operating
1 Phase	AUUW126C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW186C	PSC	DC300V ± 10%	DC280V ± 10%
	AUUW246D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW306D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW366D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW426D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW486D	PFC	DC300V ± 10%	DC380V ± 10%
	AUUW606D	PFC	DC300V ± 10%	DC380V ± 10%
3 Phase	AUUW368D	PSC	DC540V ± 10%	DC500V ± 10%
	AUUW428D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW488D	PFC	DC540V ± 10%	DC680V ± 10%
	AUUW608D	PFC	DC540V ± 10%	DC680V ± 10%

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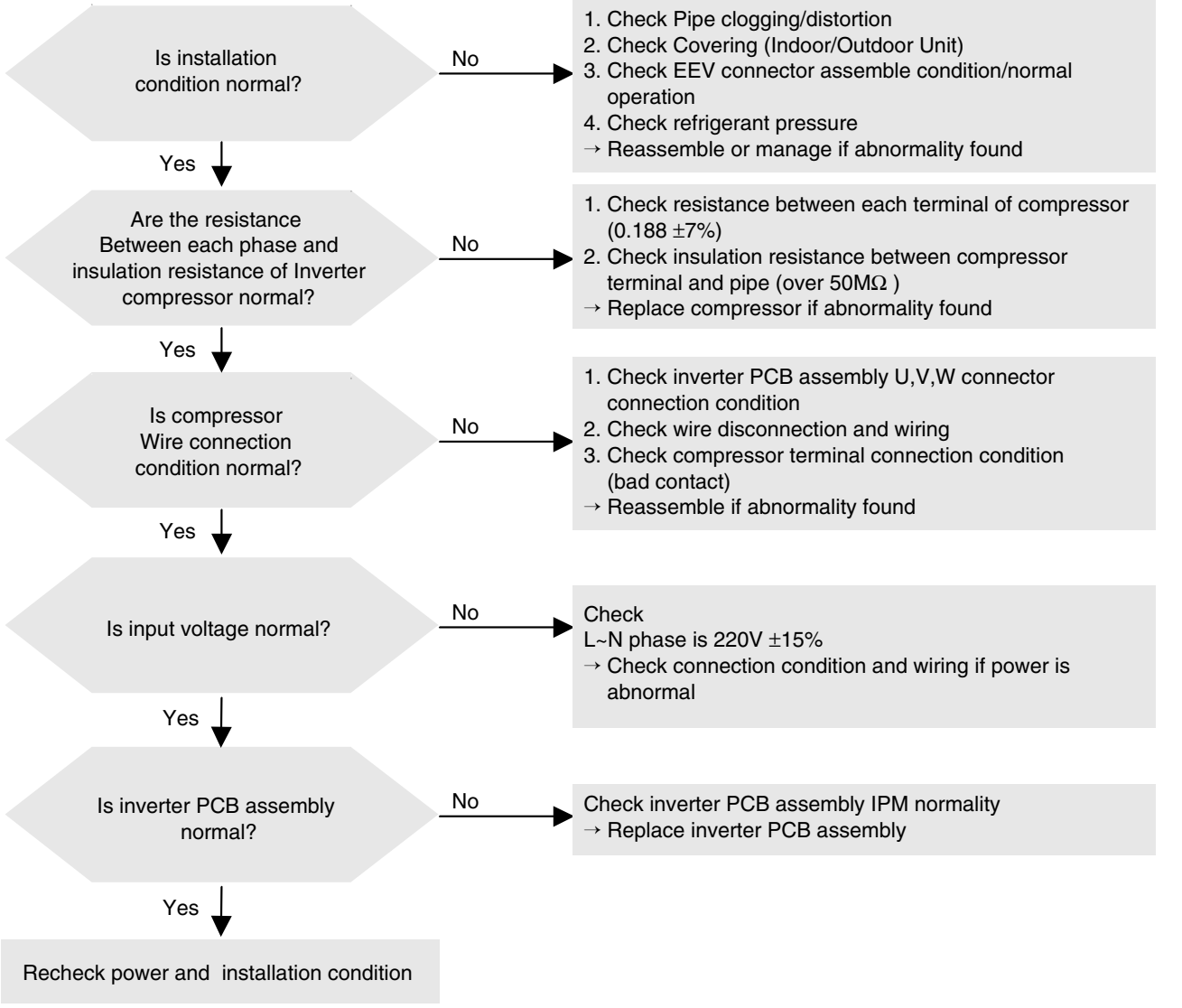
6.16 Check code Trouble shooting CH29

Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU inverter PCB assembly damage

Check Flow Chart


Is installation condition normal?
No
1. Check Pipe clogging/distortion
2. Check Covering (Indoor/Outdoor Unit)
3. Check EEV connector assemble condition/normal operation
4. Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Are the resistance Between each phase and insulation resistance of Inverter compressor normal?
No
1. Check resistance between each terminal of compressor (0.188 ±7%)
2. Check insulation resistance between compressor terminal and pipe (over 50MΩ)
→ Replace compressor if abnormality found
Yes
Is compressor Wire connection condition normal?
No
1. Check inverter PCB assembly U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition (bad contact)
→ Reassemble if abnormality found
Yes
Is input voltage normal?
No
Check
L~N phase is 220V ±15%
→ Check connection condition and wiring if power is abnormal
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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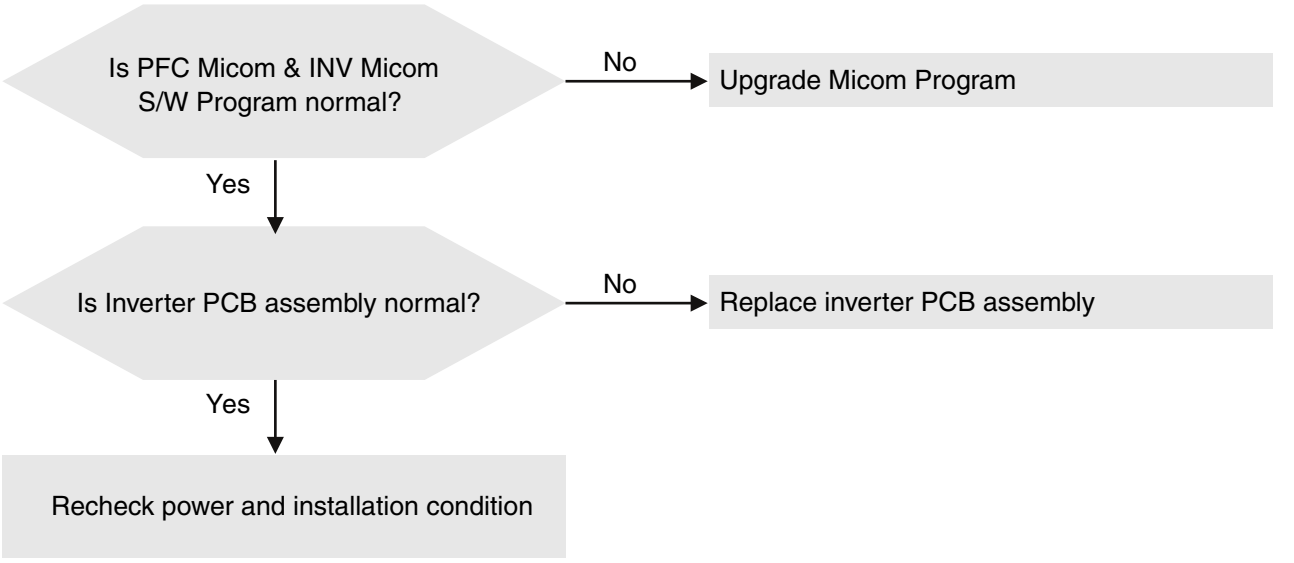
6.17 Check code Trouble shooting CH39

Display code	Title	Cause of error	Check point & Normal condition
39	Transmission Error Between (PFC Micom → INV Micom)	Communication Error Between PFC Micom and INV Micom.	1. Micom defect/Circuit defect 2. Different Micom S/W Version 3. ODU inverter PCB assembly damage

Check Flow Chart



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6.18 Check code Trouble shooting CH40

Display code	Title	Cause of error	Check point & Normal condition
40	C/T Internal circuit	• Initial current error	• Malfunction of current detection circuit. (Open / Short) • The voltage of “C01N” Is 4.0Vdc (25A) ↑.

Check Flow Chart

Check the input power
AC230V
(Outdoor, Indoor unit)

↓

Is it normal ?
(230V±10%)
→ No
Correct connection

↓ Yes

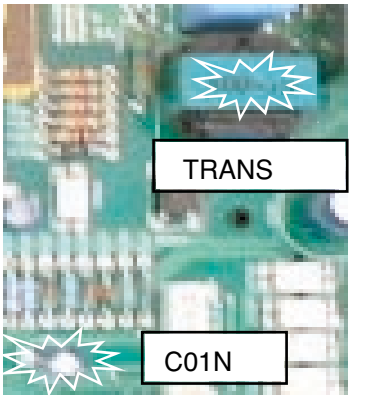
Check “C01N”
Is it normal (4.0Vdc↓)?
→ No
Change Main PCB

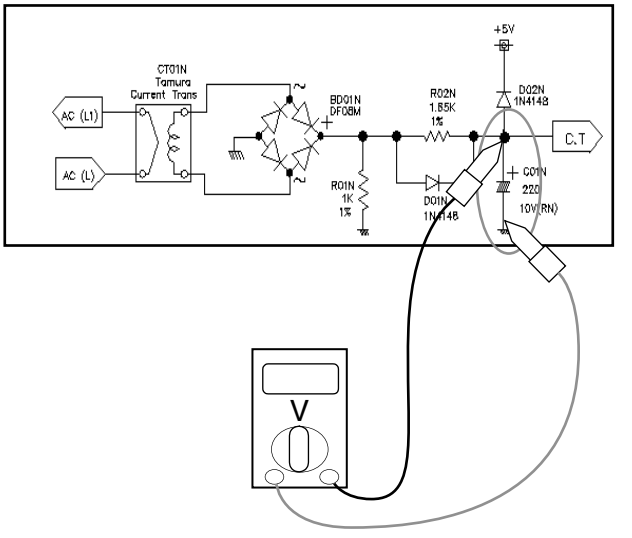
↓ Yes

Check Check TRANS
Is it normal?
→ No
Change TRANS

↓ Yes

Change main PCB





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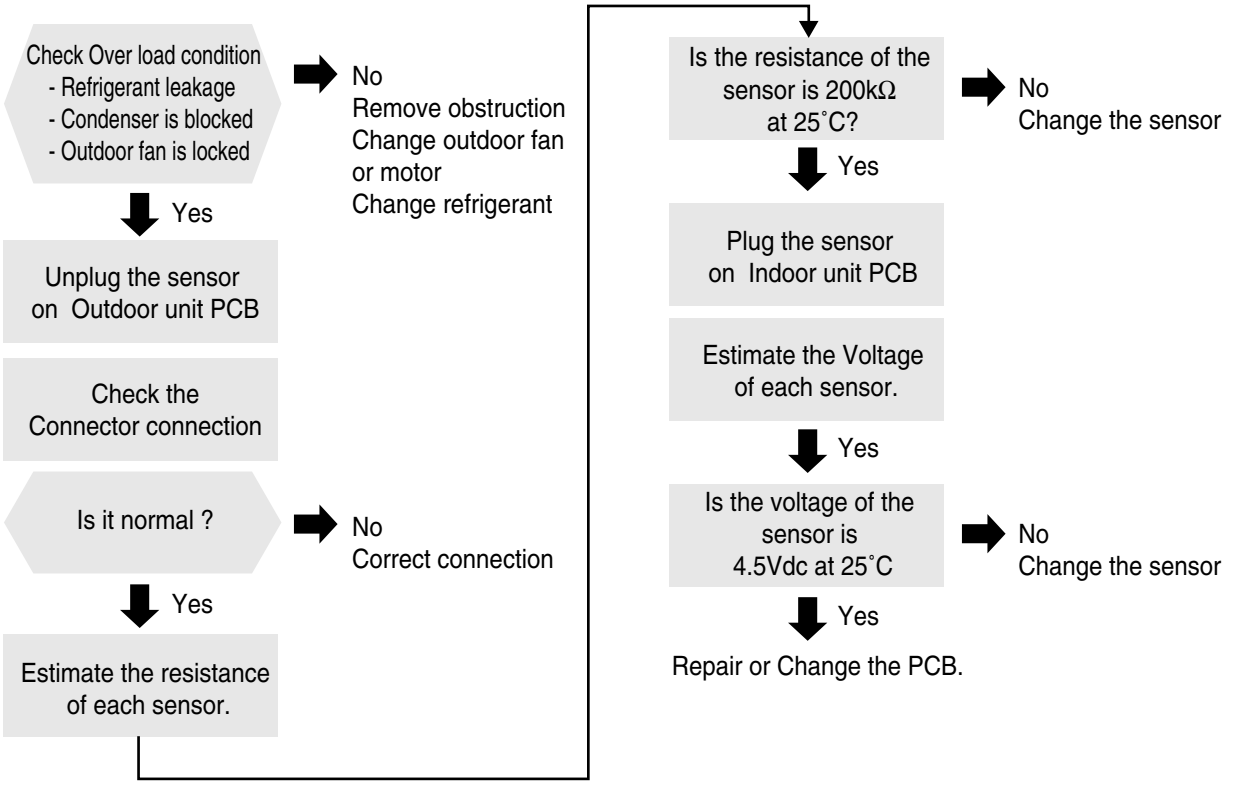
6.19 Check code Trouble shooting CH32, CH33

Display code	Title	Cause of error	Check point & Normal condition
32	D-pipe (Inverter) temp. high (105˚C↑)	• Discharge sensor (Inverter) temp. high	• Check the discharge pipe sensor for INV. • Check the install condition for over load. • Check the leakage of refrigerant. • Check the SVC V/V open. • Refer to sensor resistance table.
33	D-pipe (Constant) temp. high (105˚C↑)	• Discharge sensor (Cons.) temp. high	• Check the discharge pipe sensor for Cons. • Check the install condition for over load. • Check the leakage of refrigerant. • Check the SVC V/V open. • Refer to sensor resistance table.

Check Flow Chart



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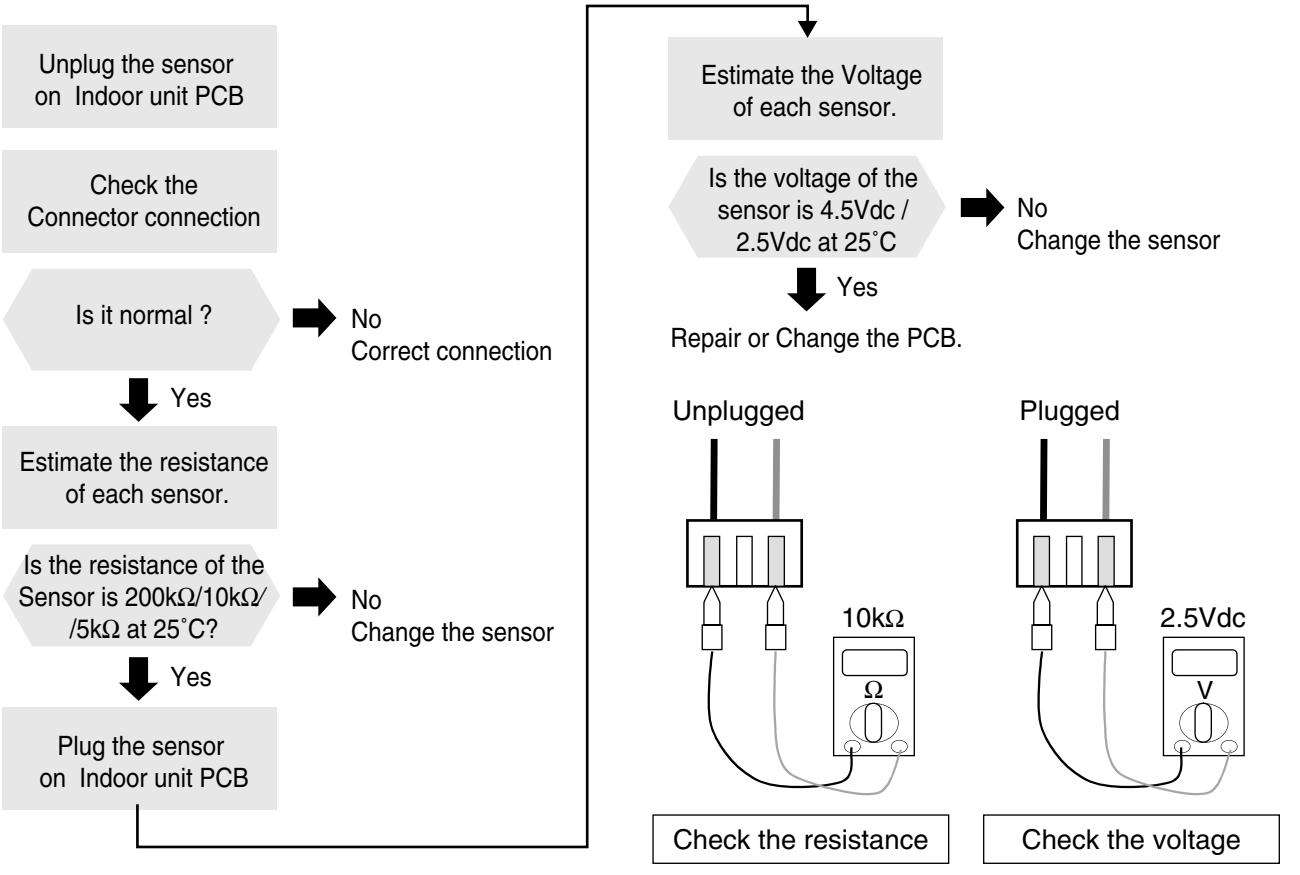
6.20 Check code Trouble shooting CH41, CH44, CH45, CH46, CH47, CH65

Display code	Title	Cause of error	Check point & Normal condition
41 **47**	D-pipe sensor(Inv) D-pipe sensor(Cons)	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 200KΩ/ at 25˚C (Unplugged) • Normal voltage : 4.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
44	Air sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 10KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
45 **46**	Condenser Pipe sensor Suction Pipe sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
65	Heat sink sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.

Check Flow Chart



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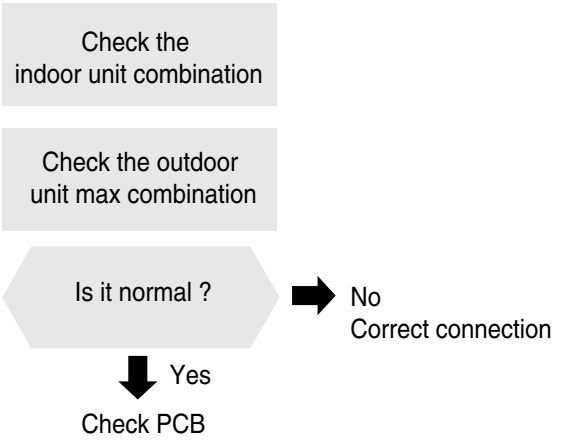
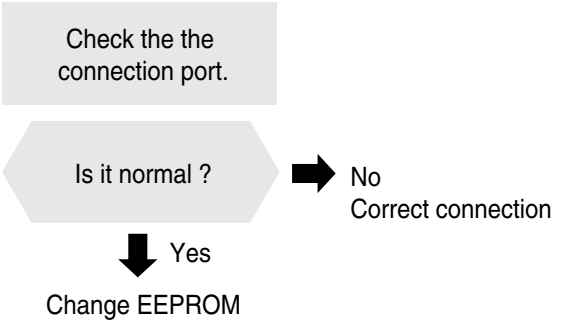
6.21 Check code Trouble shooting CH51, CH60

Display code	Title	Cause of error	Check point & Normal condition
51	Over capacity	• Over capacity Combination	• Check the indoor unit capacity. • Check the combination table.
60	EEPROM Check sum	• Check sum error	• Check the connection port. • Check the poor soldering.

Check Flow Chart (CH51)



Check Flow Chart (CH60)



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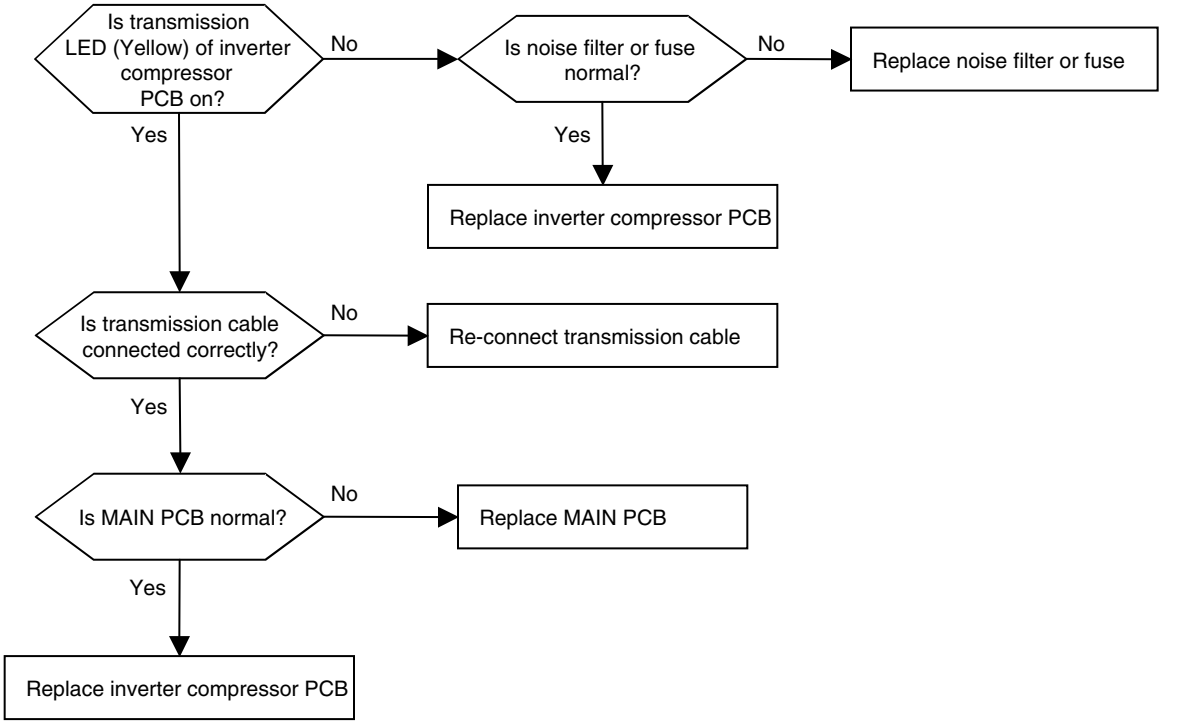
6.22 Check code Trouble shooting CH52

Display code	Title	Cause of error	Check point & Normal condition
52	Transmission error between (Inverter PCB ➔ Main PCB)	Main controller of Master unit of Master unit can't receive signal from inverter controller	1. Power cable or transmission cable is not connected 2. Defect of outdoor Main fuse/Noise Filter 3. Defect of outdoor Main / inverter PCB

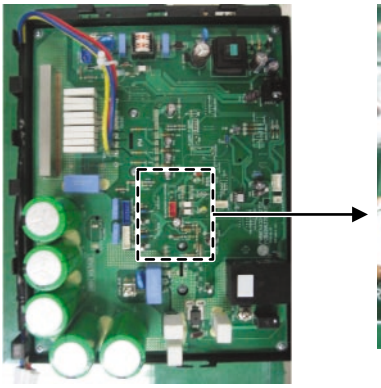
■ Error diagnosis and countermeasure flow chart

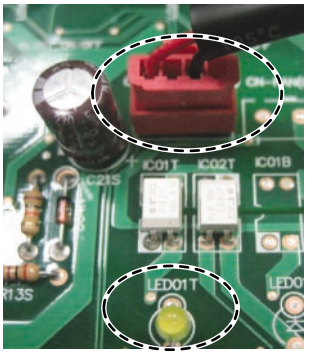


Check Point

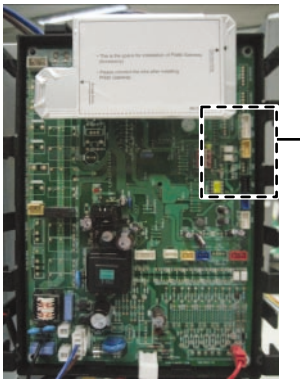
- Check the Transmission connector and LED (Main & Inverter)

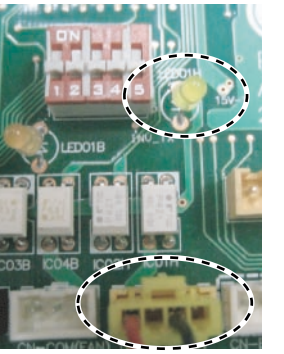
▸ 42/48/60k





<Inverter PCB>





<MAIN PCB>

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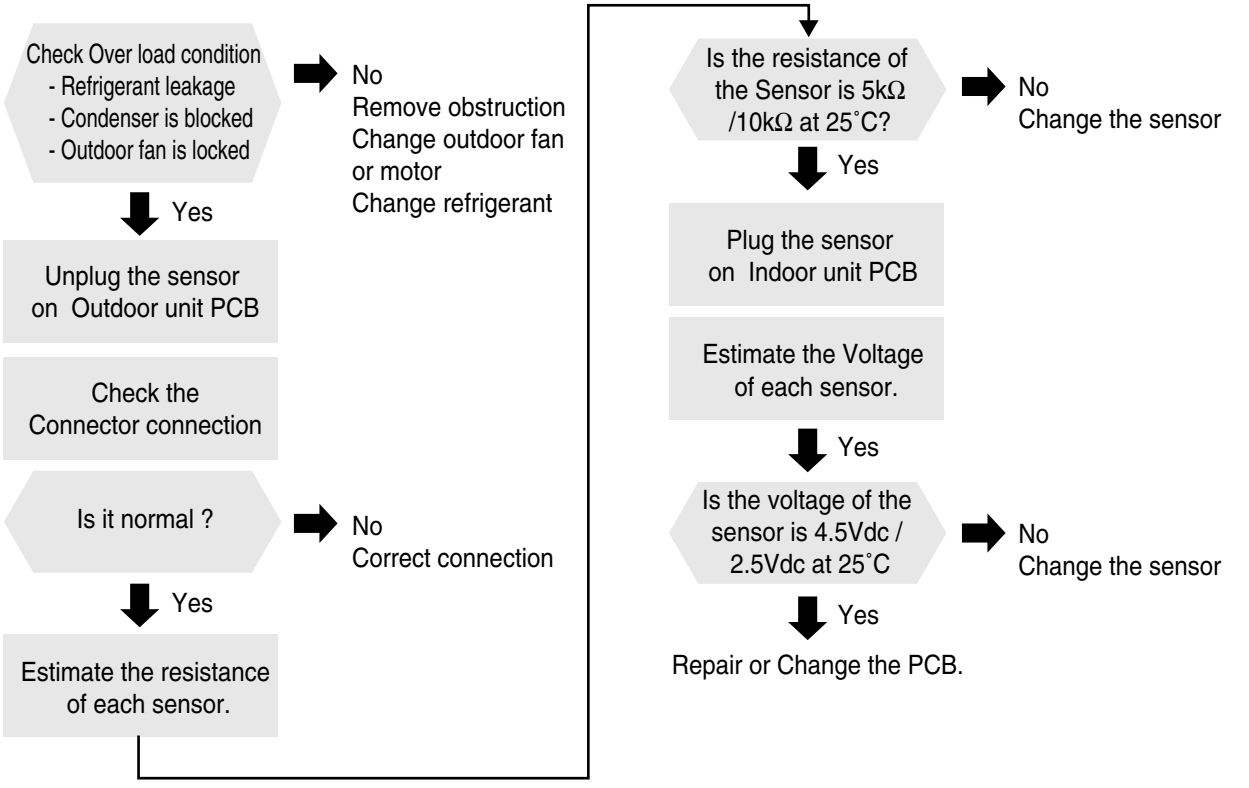
6.23 Check code Trouble shooting CH61, CH62

Display code	Title	Cause of error	Check point & Normal condition
61	Condenser pipe sensor temp. high	• condenser pipe sensordetected high temp.(65˚C)	• Check the load condition. • Check the sensor of Condenser pipe sensor. • Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (Plugged)
62	Heat sink sensor temp. high	• heat sink sensor detected high temp. (85˚C)	• Check the load condition. • Check the sensor of heat sink. • Normal resistor : 10KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (Plugged)

Check Flow Chart



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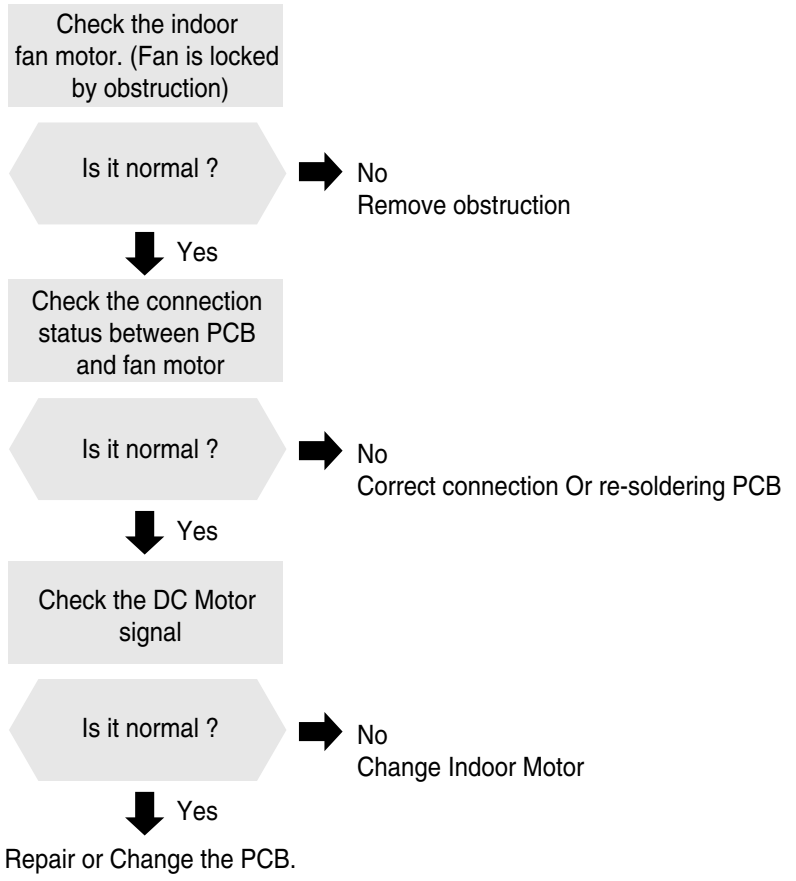
6.24 Check code Trouble shooting CH67

Display code	Title	Cause of error	Check point & Normal condition
67	BLDC motor fan lock (Outdoor)	• Fan motor break down • Fan motor & PCB poor contact • Obstruction to the fan	• Check the indoor fan motor. • Check the connection status between • PCB and fan motor.

Check Flow Chart



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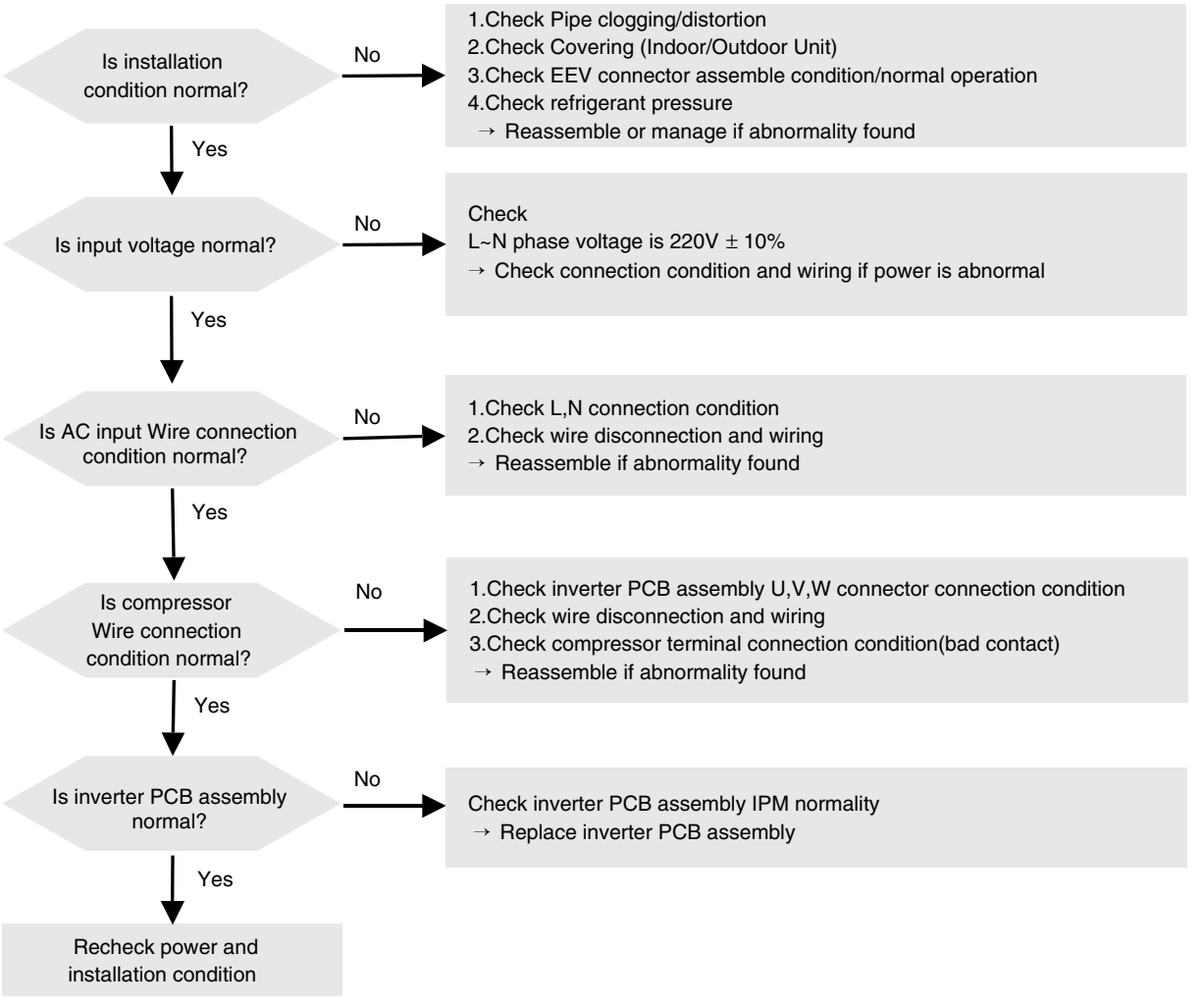
6.25 Check code Trouble shooting CH73

Display code	Title	Cause of error	Check point & Normal condition
73	AC input instant over current error (Matter of software)	Inverter PCB input power current is over 48A(peak) for 2ms	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref.overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L, N) 4. Power line assemble condition abnormal 5. Inverter PCB assembly damage (input current sensing part)

Check Flow Chart


Is installation condition normal?
No
1.Check Pipe clogging/distortion
2.Check Covering (Indoor/Outdoor Unit)
3.Check EEV connector assemble condition/normal operation
4.Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Is input voltage normal?
No
Check
L~N phase voltage is 220V ± 10%
→ Check connection condition and wiring if power is abnormal
Yes
Is AC input Wire connection condition normal?
No
1.Check L,N connection condition
2.Check wire disconnection and wiring
→ Reassemble if abnormality found
Yes
Is compressor Wire connection condition normal?
No
1.Check inverter PCB assembly U,V,W connector connection condition
2.Check wire disconnection and wiring
3.Check compressor terminal connection condition(bad contact)
→ Reassemble if abnormality found
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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Sensor resistance table

Pipe Temp

B Constant	3977	
Std Temp	25	
Resistance	5	
Temp	Resistance	Volt
-30	102.17	4.714
-25	73.49	4.611
-20	53.55	4.481
-15	39.5	4.322
-10	29.48	4.131
-5	22.24	3.91
0	16.95	3.661
5	13.05	3.389
10	10.14	3.102
15	7.94	2.808
20	6.28	2.515
25	5	2.232
30	4.01	1.965
35	3.24	1.717
40	2.64	1.493
45	2.16	1.293
50	1.78	1.116
55	1.48	0.962
60	1.23	0.828
65	1.03	0.714
70	0.87	0.615
75	0.74	0.531
80	0.63	0.459
85	0.54	0.397
90	0.46	0.345
95	0.4	0.3
100	0.34	0.262

Air Temp

B Constant	3977	
Std Temp	25	
Resistance	10	
Temp	Resistance	Volt
-30	204.35	4.72
-25	146.97	4.62
-20	107.09	4.492
-15	79	4.336
-10	58.95	4.149
-5	44.47	3.931
0	33.9	3.685
5	26.09	3.416
10	20.27	3.131
15	15.89	2.838
20	12.55	2.546
25	10	2.262
30	8.03	1.994
35	6.49	1.745
40	5.28	1.519
45	4.32	1.316
50	3.56	1.137
55	2.95	0.981
60	2.46	0.846
65	2.06	0.729
70	1.74	0.628
75	1.47	0.542
80	1.25	0.469
85	1.07	0.406
90	0.92	0.353
95	0.79	0.307
100	0.68	0.268

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Heatsink Temp

B Constant	3970	
Std Temp	25	
Resistance	10	
Temp	Resistance	Volt
-30	102.17	4.71
-25	73.49	4.61
-20	53.55	4.48
-15	39.5	4.32
-10	29.48	4.13
-5	22.24	3.91
0	16.95	3.66
5	26.05	4.73
10	20.25	4.66
15	15.87	4.57
20	12.55	4.47
25	10	4.35
30	8.03	4.21
35	6.49	4.06
40	5.28	3.89
45	4.33	3.71
50	3.57	3.52
55	2.96	3.32
60	2.47	3.11
65	2.07	2.9
70	1.74	2.69
75	1.48	2.48
80	1.26	2.28
85	1.07	2.09
90	0.92	1.9
95	0.8	1.73
100	0.69	1.57

D-Pipe Temp

B Constant	3500	
Std Temp	25	
Resistance	200	
Temp	Resistance	Volt
-30	2845.99	4.969
0	585.66	4.851
5	465.17	4.814
10	372.49	4.77
15	300.58	4.717
20	244.33	4.657
25	200	4.587
30	164.79	4.508
35	136.64	4.418
40	113.98	4.318
45	95.62	4.208
50	80.65	4.088
55	68.38	3.958
60	58.27	3.82
65	49.88	3.674
70	42.9	3.522
75	37.05	3.365
80	32.14	3.205
85	27.99	3.043
90	24.46	2.88
95	21.46	2.719
100	18.89	2.561
110	14.79	2.255
120	11.72	1.972
130	9.4	1.716
140	7.62	1.487
150	6.24	1.287

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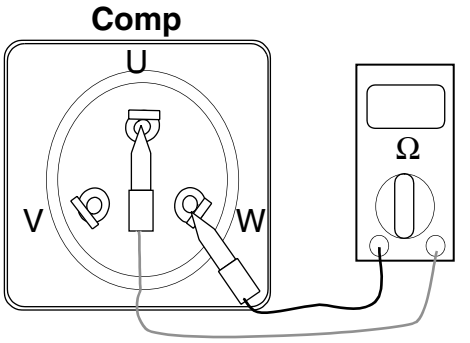
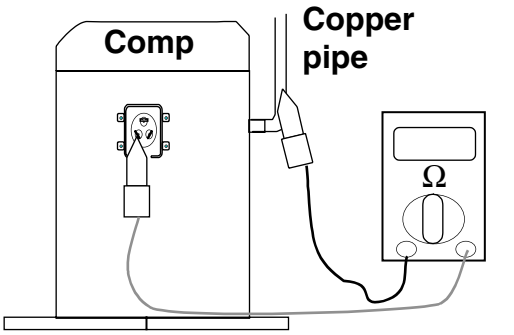
Check of compressor

■ Check resistance of the compressor



Model		Resistance(Ω at 20℃)		
		U	V	W
1 Phase	ASUW306DGM0	0.75	0.75	0.75
	ASUW366DGM0	0.44	0.44	0.44

■ Check Insulation resistance of the compressor



Resistance(Ω) at 20°C	
Terminal	All models
U-GND	More than 2MΩ
V-GND	More than 2MΩ
W-GND	More than 2MΩ

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